CORRECTIVE ACTION PLAN

JAMUL-DULZURA SCHOOL DISTRICT
TRANSPORTATION YARD
14581 LYONS VALLEY ROAD
JAMUL, CALIFORNIA
DEH CASE NO. H03764-002

PROJECT NO. 267.1.19
AUGUST 10, 2005

8360 Clairemont Mesa Blvd., Suite 107 • San Diego, CA 92111 • Phone (858) 268-4248 • Fax (858) 268-4528
hargraveenvironmental.com

Project No. 267.1.19
August 10, 2005

Mr. Jim LaChusa
Jamul-Dulzura School District
14581 Lyons Valley Road
Jamul, California 91935

SUBJECT: CORRECTIVE ACTION PLAN, JAMUL-DULZURA SCHOOL DISTRICT TRANSPORTATION YARD, 14581 LYONS VALLEY ROAD, JAMUL, CALIFORNIA, DEH CASE No. H03764-002.

References: Letter from Mr. Kent Huth, County of San Diego Department of Environmental Health (DEH), dated January 19, 2005.

Dear Mr. LaChusa:

In accordance with your request, Hargrave Environmental Consulting, Inc. (HEC) is submitting the following Corrective Action Plan (CAP) for the subject site.

If you have any questions or comments, please do not hesitate to contact us.

Respectfully,

HARGRAVE ENVIRONMENTAL CONSULTING, INC.

Chuck Hargrave
President

Gerald Shiller
Professional Geologist
PG # 4558

PROFESSIONAL GEOLOGIST
GERALD I. SHILLER
PG-4558
exp 2/28/06
STATE OF CALIFORNIA

CH\bs

Distribution: (1) Addressee
(1) Mr. Kent Huth, County of San Diego, DEH

Share\jamul\Reports\CAP\267-1-19.wpd

Project No. 267.1.19
July 25, 2005

TABLE OF CONTENTS

TABLES

CHARTS

CHART X: MW-8 GROUNDWATER TRENDS
Project No. 267.1.19
August 10, 2005

TABLE OF CONTENTS (cont.)

FIGURES

APPENDIX

Project No. 267.1.19
August 10, 2005

INTRODUCTION

The purpose of this document is to present a Corrective Action Plan (CAP) for the remediation of hydrocarbon impacted soils and groundwater associated with the pre-existing underground storage tanks (USTs) that were removed from 14581 Lyons Valley Road, Jamul, California (see Figure No. 1, Site Location).

This CAP presents a review of past assessment activities including a site conceptual model, a description of proposed clean-up levels, evaluation of remediation options, a description of the selected remediation option, and implementation of the selected remediation option.

SITE DESCRIPTION

The subject site is located at 14581 Lyons Valley Road, Jamul, California 91935, and the Assessor's Parcel Number (APN) is 596-152-21 (see Figure No. 1, Site Location). The site, approximately 130 feet by 250 feet, is the Jamul-Dulzura Union School District's transportation yard. The property is comprised of an asphalt paved yard where school buses and other school district vehicles are parked, and miscellaneous equipment is stored (see Figure No. 2, Site Plan with Groundwater Conditions). Site structures include a metal-sided maintenance shop and several buildings that contain school district offices. There is an elementary school adjacent to the west side of the transportation yard. There are also rural residential properties to the north of the site, across Lyons Valley Road, and to the east and south of the site. A small, intermittent creek lies just outside of the south side of the site.

BACKGROUND

On December 1, 1998, one 1,000-gallon steel gasoline UST (tank #1), one 2,000-gallon fiberglass diesel UST (tank #2), and associated dispensing equipment were removed from the site. The gasoline UST was reportedly installed between 1958 and 1970 and the diesel UST was reportedly installed in 1975. At the time of UST and equipment removal, the inspector noted three small holes in tank #1, as well as petroleum odors and discolored soil in the excavation. Clean backfill material was placed in the excavation following UST removal.

Laboratory analysis results from soil samples obtained beneath the former USTs and dispenser pad reportedly contained Total Petroleum

Hydrocarbon (TPH) concentrations ranging from <10 parts per million (ppm) to 190 ppm for gasoline (TPHg), and <10 ppm to 9,200 ppm for diesel (TPHd).

Eight groundwater monitoring wells were installed at the subject site between August 3, 1999 and July 28, 2003. On November 25 and 26, 2002, three of the monitoring wells (MW-1, MW-2, and MW-3) were over-drilled and deepened to accommodate the decreasing groundwater levels observed at the site (see Table I, Well Construction Details).

From August 25 to September 1, 2000, a remedial soil excavation was performed at the site. A total of 1,590.59 tons of hydrocarbon affected soils were removed from the ground during the excavation and transported to a licensed treatment facility. Monitoring well MW-4 was destroyed during the excavation.

Following the excavation, a quarterly groundwater monitoring and sampling program was initiated on November 1, 2000. Laboratory analysis results from groundwater samples obtained from the eight monitoring wells and three irrigation wells indicate there is an methyl-tert-butyl-ether (MTBE) plume extending approximately 100 feet to the southwest of the former tank pit. There has been no indication during any of the past groundwater monitoring and sampling events that benzene, toluene, ethylbenzene, or xylenes (BTEX) are present in the groundwater at the subject site. MTBE impacts have been noted in the past from MW-1, MW-2, MW-3, MW-5, and MW-6 at concentrations up to 135 parts per billion (ppb), 33.9 ppb, 3,490 ppb, 5,390 ppb, and 421 ppb, respectively. The limits of MTBE impacts to groundwater from the most recent sampling event are presented on Figure No. 3, Site Plan with MTBE Contours. A summary of laboratory results from previous groundwater monitoring and sampling events is presented in Table II, Summary of Groundwater Monitoring Data. These results indicate that the extent of hydrocarbon impacts to groundwater has been generally assessed and that impacts are generally limited to the southern portion of the Jamul-Dulzura School District property, and extend approximately 120 feet southeast of the former location of the USTs.

The site was assigned a Class A priority for MTBE migration by the County of San Diego, Department of Environmental Health (DEH), and the California Regional Water Quality Control Board (CRWQCB) because there are active groundwater irrigation wells on-site. The Class A priority classification requires a fast-track approach to site assessment and mitigation activities. In December 2001,

Hargrave Environmental Consulting, Inc. (HEC) conducted a sensitive receptor survey in the vicinity of the subject site. The survey identified 20 sensitive groundwater receptors (including the intermittent creek and irrigation wells) within a 2,250-foot radius of the subject site. Two off-site private wells are down-gradient from the site. However, the distance of these wells from the site is great enough for the risk of MTBE impacts reaching these wells to be relatively low.

GEOLOGY/HYDROGEOLOGY

Based on a review of the references, the site is underlain at depth by Mesozoic granitics of the southern California batholith. The materials observed during past drilling and excavating activities at the site consisted of topsoil and decomposed granitic soils. Topsoil generally consisted of brown, clayey sands that extended to depths of 0-5 feet below ground surface (bgs). Decomposed granitic materials generally consisted of reddish to olive brown, and gray, silty sands. As depth increased, the decomposed granite became less decomposed, to the point that boulders of weathered granite were present as shallow as 13 feet bgs.

Three active irrigation wells (I-1, I-2, and I-3), used for irrigation of playground areas at the school west of the transportation yard, are located within 275 feet of the UST excavation. One irrigation well is 40 feet northeast, one is 110 feet north northeast, and one is 275 feet southwest of the former tank excavation. Depending on atmospheric conditions, water for irrigation may be pumped from the wells as often as every other day. The locations of the wells are shown on Figure No. 2, Site Plan with Groundwater Conditions.

The subject site is located within the Jamul Hydrologic Subarea (10.33) of the Otay Hydrologic Unit. The CRWQCB has assigned beneficial use designation for groundwater in this subarea for municipal, agricultural, and industrial purposes, and the County of San Diego, DEH has categorized this site as a sensitive-groundwater-use site. Based on the groundwater depths measured during the most recent groundwater monitoring event on June 27, 2005, stabilized groundwater was measured in the monitoring wells at depths ranging from 10.99 to 16.63 feet below top of well casing (TOC), or at elevations ranging from 1129.89 to 1138.30 feet above MSL. Groundwater depths rose between 14.57 and 18.65 feet bgs from the previous monitoring event completed in December 2004. Due to heavy seasonal rainfall water levels were above the top of the well screen in MW-1, MW-2, MW-3, MW-8, MW-9, and all three irrigation

wells. Depth to groundwater in the irrigation wells was measured at 18.12 (I-1), 18.21 (I-2), and 11.95 (I-3) feet bgs. The groundwater gradient was calculated to be 0.02 feet/foot to 0.04 feet/foot generally towards the southwest which is similar to the previous monitoring event in December 2004.

The CRWQCB has assigned beneficial use designation for surface waters in this subarea for municipal, agricultural, industrial, recreation, and wildlife habitat purposes. A small creek, which is a tributary of Jamul Creek, runs along the south and east sides of the school district property. The creek was dry during this field investigation, but sometimes has surface flows during the winter rainy season. Surface runoff from the school district site is toward the creek. Municipal water is supplied throughout the entire site vicinity by the Otay Water District.

SENSITIVE RECEPTOR SURVEY

Past assessment also included searching for potential receptors within a 2,250 foot radius of the subject site. The results from this investigation identified a total of 20 potential sensitive receptors within a 2,250-foot radius of the subject site (19 wells and 1 creek). Two of the off-site, private wells are down gradient from the school district site. Well W04952 is located approximately 1,800 feet west southwest of the site, and well number 1 (identified from the HEC field survey) is located approximately 2,100 feet south southeast of the site. The distance of these wells from the school district site is great enough to make the risk of MTBE impacts reaching these wells relatively low.

The 3 irrigation wells on the school district property and the adjacent creek are within 300 feet of the former USTs. The potential for MTBE to impact irrigation wells is considered to be moderate to high because the frequent pumping of water from the wells during dry periods may accelerate MTBE migration from the former UST pit. However, the source of the contamination has been removed and the MTBE concentrations in the groundwater have been declining. The potential for MTBE impacts to affect creek surface waters is considered to be low to moderate because impacted near-surface soils were removed and hauled away, and the groundwater level is approximately 15 feet lower in elevation than the creek bed. One potentially sensitive human receptor, the elementary school, is located at the subject site. No other potentially sensitive human receptors were noted.

SITE CONCEPTUAL MODEL

Based on the information presented in previous site assessment reports, including soil sampling and analyses, and past groundwater monitoring events, the following model is presented.

An unauthorized release of gasoline was discovered at the subject site on December 1, 1998, when one 1,000-gallon steel gasoline UST (tank #1), one 2,000-gallon fiberglass diesel UST (tank #2), and associated dispensing equipment were removed from the site. As the fuel was leaking, impacts spread first to the tank backfill material, and subsequently to the surrounding and underlying native formational material. At some point, impacts from the soil migrated to the groundwater. As delineated by the existing groundwater monitoring wells, fuel impacts in the groundwater migrated to the southwest from the former USTs. The direction of migration of impacts to groundwater is consistent with the groundwater gradient calculated for this site from monitoring data (see Figure No. 2, Site Plan with Groundwater Conditions).

A review of all laboratory results indicates that gasoline is the major, and perhaps only, contaminant present in the soil and groundwater samples obtained during site assessment investigations.

The lateral and vertical extent of hydrocarbon impacts to soil have been assessed. Approximately 1,590.59 tons of impacted soils with a TPH concentration greater than 100 ppm were excavated and removed from the site in September 2000. The limits of the excavation are presented on Figure No. 4, Excavation Area, Figure No. 5, Cross Section A-A', and Figure No. 6, Cross Section B-B'. Results of soil samples obtained during the interim soil excavation are presented on Table III, Summary of Soil Sample Analyses. No residual soil contamination with TPH concentrations greater than 100 ppm remains at the subject site.

Concentrations of MTBE in the five monitoring wells (MW-1, MW-2, MW-3, MW-5, and MW-6) have been diminishing due to the previous remedial excavation of hydrocarbon-impacted soils, which removed the source of on-going impacts to groundwater quality. Charts I, III, IV, VI, and VIII display groundwater trends and MTBE concentrations.

CONTAMINANT CHARACTERISTICS

The contaminants of concern at the subject property are gasoline and its components BTEX, naphthalene, and MTBE. The primary health risks associated with each of the chemical components of gasoline are as follows:

Gasoline: Suspected human carcinogen. Low-level inhalation exposure to gasoline can cause irritation to the eyes, nose, and respiratory system; headache; and nausea.

Benzene: Suspected human carcinogen. Low level inhalation exposure to benzene can cause irritation to the eyes, skin, nose, and respiratory system; headache, and nausea. Benzene has a California Maximum Contaminant Level (MCL) for drinking water of 1 ppb.

Toluene: Low level inhalation exposure to toluene can cause fatigue, weakness, confusion, and euphoria. Toluene has a MCL for drinking water of 150 ppb.

Ethylbenzene: Low level inhalation exposure to ethylbenzene can cause irritation to the eyes, skin, and mucous membranes; and headache. Ethylbenzene has a MCL for drinking water of 700 ppb.

Xylenes: Low level inhalation exposure to xylenes can cause irritation to the eyes, skin, nose, and throat; dizziness, excitement, nausea, and drowsiness. Xylenes have a MCL for drinking water of 1,750 ppb.

MTBE: Suspected human carcinogen. Thirty times more soluble than benzene. Low level inhalation exposure to MTBE can cause irritation to the eyes, nose and respiratory system; headache, and nausea. MTBE has a primary MCL of 13 ppb, and a secondary MCL for taste and odor concerns of 5 ppb.

Naphthalene: Vapors are highly irritating to the eyes and may cause cataracts upon chronic exposure. Acute exposure to naphthalene may cause methemoglobinemia and hemolytic anemia as well as damage to the kidneys. Symptoms may include headache and nausea. Individuals with glucose-6-phosphate dehydrogenase deficiency may be at increased risk. A chronic non-cancer Reference Exposure Level (REL) of 14 micrograms per cubic meter is listed for naphthalene. Naphthalene has an MCL for drinking water of 170 ppb.

TARGET CLEANUP LEVELS

The CRWQCB has assigned beneficial use designation for groundwater within this hydrologic subarea for industrial, recreational, and species habitat purposes. Therefore, the California MCLs for the contaminants of concern apply as cleanup standards at this site.

The clean-up levels for soils at the site should be such that the hydrocarbons in soil will not cause concentrations of hydrocarbons in groundwater to exceed their established clean-up levels. Past remediation removed all soils from the source area with impacts greater than 100 ppm. However, residual soil contamination is likely present in the smear zone down gradient from the remedial excavation area. MTBE in groundwater has been determined to be the principal contaminant of concern because of the proximity of the groundwater impacts to the irrigation wells located on the school property.

RISK ANALYSES

Potential receptors that might become affected by the soil or groundwater impacts at the site include the three irrigation wells located on the school grounds. Irrigation well I-1 is located approximately 40 feet up gradient from the former UST excavation, I-2 is located approximately 105 feet up gradient from the former UST excavation, and I-3 is located approximately 275 feet down gradient from the former UST location.

HEC used MTBE concentrations from the most recent MW-5 groundwater data to calculate the cancer risk posed by potential vapor migration off the groundwater into a commercial structure. The groundwater sample from MW-5, collected on 6/27/05, contained a MTBE concentration of 284 µg/l . The only site specific parameters used in the risk calculation for a commercial scenario were the sample depth (depth to groundwater) and the MTBE sample concentrations. All other parameters used in the risk calculation were the default values for a child or adult scenario provided with the model. Based on this input, and using the SA/M Vapor Risk Assessment Model, we calculated a child risk factor of 5.13×10^{-9} for MTBE, and an adult risk factor of 7.85×10^{-9} for MTBE (see Appendix A, Vapor Risk Calculations). These values are lower than the default standard for acceptable risk of 1×10^{-6}.

NATURAL ATTENUATION CALCULATIONS

Two methods of calculating the natural attenuation of MTBE at the

site have been completed. By assuming that on-going natural processes will continue to reduce MTBE concentrations at the site over time, it is possible to estimate the length of time necessary to reach the MCL.

The first method is to use the predictive capability of Microsoft Excel to extrapolate a trendline on the MTBE charts for MW-1, MW-3, and MW-5 to a point where it crosses the 13 ppb MCL for MTBE. Using this method the approximate times to reach MCLs are as follows:

1. Chart II, MW-1 Estimated MTBE Attenuation, MCL achieved in approximately 4 years
2. Chart V, MW-3 Estimated MTBE Attenuation, MCL achieved in approximately 10 years
3. Chart VII, MW-5 Estimated MTBE Attenuation, MCL achieved in approximately 8 years

The second method of natural attenuation calculation assumes a simple first-order decay over time. The analyses also assumes that the MTBE concentrations observed in the monitoring wells are representative of the MTBE concentrations present in the groundwater throughout the site. It is then possible to estimate a first order decay coefficient (k) using the following equation:

$$C/C_0 = e^{(kt)}$$

where:

C = benzene and MTBE concentration (ppb) at time t
C_0 = benzene and MTBE concentration at time t=0
k = first order decay coefficient ($days^{-1}$)
t = time (days)

Once a k value has been calculated, it is plugged back into the equation with the water quality goal (MCL of 13 ppb for MTBE) as an end point, and the equation is solved for the length of time required to reach the goal.

Based on the calculations presented in Table IV, Decay Analyses, the approximate times to reach MCLs are as follows:

1. MW-1 MTBE MCL achieved in approximately 2.9 years
2. MW-3 MTBE MCL achieved in approximately 6.2 years
3. MW-5 MTBE MCL achieved in approximately 5.5 years

If one assumes that the unauthorized release occurred shortly before the tank system was removed, then it is possible to estimate the minimum length of time that it took for the plume of impacts to spread to its current extent. At the other end of the spectrum, the maximum amount of time for impacts to spread would be based on the assumption that the tank system started leaking shortly after it was installed (assumes 1958 based on review of site blueprints).

As stated above, the UST and dispenser were removed in December 1998. Impacts to groundwater were discovered in MW-1 and MW-3 (source area) in October 1999, and in MW-6 (down gradient well) in August 2000. MW-6 is approximately 125 feet down gradient from the former location of the UST and 140 feet from the former dispenser. Using these figures, the maximum rate of migration of groundwater impacts is approximately 82 feet per year (1.5 years to migrate 125 feet). If this was really the migration rate, impacts would have reached MW-8 in 2001 or 2002 which has not occurred. The minimum rate of migration of groundwater impacts is approximately 3.0 feet per year (42 years to migrate 125 feet). Based on the minimum migration rate groundwater impacts would reach I-3 in approximately 58 years. However, the remedial soil excavation which took place in August 2000 removed the source of on-going impacts which slows down the rate of migration of impacts. In addition, natural attenuation is reducing MTBE concentrations across the site and causing the existing MTBE plume to shrink. In conclusion, by the time the plume of groundwater impacts reaches irrigation well I-3, the hydrocarbon concentrations are predicted to be below MCLs.

EVALUATION OF REMEDIATION OPTIONS

Several commonly implemented groundwater containment options were selected for evaluation based on past success in use with shallow groundwater contamination at sites with similar subsurface soils:

1. Natural Attenuation
2. Groundwater stabilization by pumping and on-site treatment by liquid-phase carbon adsorption
3. Groundwater stabilization by pumping and on-site treatment by air stripping

All of the groundwater containment options were evaluated based on technical feasibility, performance, regulatory acceptance, clean-up time, and cost effectiveness.

OPTION 1: NATURAL ATTENUATION

Technical Feasibility

* Relatively easy to implement, if allowed by regulatory agencies.

Performance

* Will not actively reduce hydrocarbon concentrations, or retard further migration. Concentrations will be reduced by natural biodegradation and dispersion.

* Does not reduce any potential environmental or public health risks in the short and medium term.

Clean-up Period

* Based on the natural attenuation calculations presented in this CAP, MCLs will likely be reached by 2015 based on current clean up guidelines.

Regulatory Acceptance

* Likely acceptable since the groundwater monitoring wells located around the perimeter of the site show no impacts from the former UST. Impacts are currently limited to 100 feet in the down gradient direction of the former USTs and trends are decreasing.

Cost Effectiveness

* No treatment costs.

* Additional groundwater monitoring and sampling events may need to be completed for verification. Costs to complete one event are already approved.

OPTION 2: GROUNDWATER STABILIZATION BY PUMPING AND ON-SITE TREATMENT BY LIQUID-PHASE CARBON ADSORPTION

Technical Feasibility

* A proven technology, relatively easy to implement.

* Groundwater extraction wells can be easily installed.

* Treated water can likely be disposed to the sewer under

permit.

* A groundwater pump feasibility test will have to be completed to address the effective draw down and radius of influence. It is likely that up to three additional groundwater extraction wells may need to be installed to effectively pump and lower groundwater across the contamination plume.

Performance

* Controls continued migration of hydrocarbons.

* Removes hydrocarbon impacted groundwater.

Clean-up Period

* May require 3 to 5 years.

Regulatory Acceptance

* Generally well accepted by regulatory agencies.

* Water disposal method will require permit approval by regulatory agencies.

Cost Effectiveness

ESTIMATED COSTS FOR SET-UP & 1 YEAR OF OPERATION:

Feasibility Study:	$ 8,000.00
Install 3 Wells:	$ 4,800.00
Install System Laterals & Electrical Hook-up:	$28,800.00
EcocoPump System & Set-up:	$20,600.00
Carbon Vessels & 1 Yr of Treatment Drum Change-outs:	$ 8,000.00
Fence Rental:	$ 1,100.00
1 Yr of Laboratory Analyses:	$ 9,600.00
1 Yr of HEC Field Investigations/Permitting/Reporting:	$28,000.00
Estimated Electrical Costs:	$ 6,200.00
Equipment & Materials:	$ 4,100.00
TOTAL:	$119,200.00

Additional One Year of System Operation: $50,000.00

OPTION 3: GROUNDWATER STABILIZATION BY PUMPING AND ON-SITE TREATMENT BY AIR STRIPPING

Technical Feasibility

* Parameters same as for Option 2, Groundwater Pumping and On-Site Treatment by Liquid-Phase Carbon Adsorption.

* Due to the concentrations of MTBE in the groundwater, additional treatment of water by carbon adsorption most likely will be required.

Performance

* Parameters same as for Option 2, Groundwater Pumping and On-Site Treatment by Liquid-Phase Carbon Adsorption.

Clean-up Period

* Parameters same as for Option 2, Groundwater Pumping and On-Site Treatment by Liquid-Phase Carbon Adsorption.

Regulatory Acceptance

* Parameters same as for Option 2, Groundwater Pumping and On-Site Treatment by Liquid-Phase Carbon Adsorption.

* Will require additional permit through the Air Pollution Control District (APCD).

Cost Effectiveness

ESTIMATED COSTS FOR SET-UP & 1 YEAR OF OPERATION:

Feasibility Study:	$ 8,000.00
Install 3 Wells:	$ 4,800.00
Install System Laterals & Electrical Hook-up:	$28,800.00
EcocoPump System & Set-up:	$20,600.00
Air Stripper/ACAV & Set-up:	$17,400.00
Carbon Vessels & 1 Yr of Treatment Drum Change-outs:	$ 8,000.00
Fence Rental:	$ 1,100.00
1 Yr of Laboratory Analyses:	$ 9,600.00
1 Yr of HEC Field Investigations/Permitting/Reporting:	$28,000.00
Estimated Electrical Costs:	$ 6,200.00
Equipment & Materials:	$ 4,100.00
TOTAL:	$139,800.00

Additional One Year of System Operation: $55,000.00

SELECTION OF PROPOSED REMEDIATION OPTION

Based on assessment of the site conditions described previously and an in-house evaluation of the above options, we are proposing no further remedial action for soils and groundwater at the site. Based on the effective removal of impacted soil across the subject site by soil excavation, the stable/decreasing groundwater plume, the previously addressed natural attenuation calculations, and the results of the risk analyses concluding a cancer risk of 5.13×10^{-9} for MTBE, a request for closure should be made. These conclusions are based on soil and groundwater conditions observed since December of 1998.

PERMITTING

This CAP will be submitted to Mr. Kent Huth, the County of San Diego, DEH, Site Assessment and Mitigation (SA/M) Division, Hazardous Materials Specialist assigned to this site. Once Mr. Huth has reviewed and approved this CAP, and completion of the public notification period, eight well permits will be obtained through the County of San Diego, DEH for the destruction of the groundwater monitoring wells. DEH approval of the CAP and issuance of well destruction permits are required for compliance with local environmental regulations.

WELL DESTRUCTION

Well destruction will be performed under the direction of an HEC geologist. The eight groundwater monitoring wells (MW-1, MW-2, MW-3, and MW-5 through MW-9) will be destroyed in accordance with the Department of Water Resources, Water Well Standards for California, Bulletin 74-90, dated December 1991 and the DEH, SA/M Manual, 2005. A jackhammer will be used to remove the well box and associated concrete. The well casing will then pulled out of the boring with the drill rig. Once the well casing is removed, the drill rig will be used with 8-inch diameter auger to over-drill the filter pack and annular seal materials to the total depth of each respective well.

Following the over-drilling of the filter pack and annular material, the auger will be removed, and each borehole will be backfilled with bentonite chips to approximately 1.0 feet bgs. The bentonite will be hydrated per manufacturer’s specifications. The remainder of the borehole will be backfilled to the surface with

concrete.

Concrete from the destroyed surface seals, along with the other materials removed from the wells, will be stored in 55-gallon drums pending disposal. The final signed disposal manifest will be submitted under separate cover.

COMMUNITY HEALTH AND SAFETY PLAN

Public exposure to potentially contaminated soil during well destruction will be limited because 1) the diameter of the borings will be relatively small (8-inch diameter), 2) as soil is removed from the borings, it will immediately be put into DOT-approved drums for storage, and 3) the drums will be stored within the site's perimeter fence where public access is restricted. Upon regulatory approval of this CAP, a public notification letter will be generated and delivered to surrounding businesses and residences for a comment period of not less than 30 days for review of the CAP. A copy of the CAP will also be placed in the local library for public review.

SCHEDULE

HEC will deliver public notices to interested parties within 2 weeks of the CAP approval from the County of San Diego, DEH. HEC will mobilize to implement the selected remediation strategy within 2 weeks of receipt of the closure letter.

LIMITATIONS

The contents of this CAP are based on the following:

1. The observations of our field personnel during the field activities;

2. Information obtained from San Diego County and State regulatory agencies; and

3. Reference documents.

Variations in soil conditions could exist beyond the points explored in this investigation. Also, changes in encountered groundwater conditions could occur at some time in the future due to variations in temperature, regional rainfall and other factors.

The services performed by HEC have been conducted in a manner

consistent with the level of care and skill ordinarily exercised by member of our profession currently practicing under similar conditions in the southern California area. No other warranty, expressed or implied, is made.

REFERENCES

1. County of San Diego, Department of Environmental Health, 2005, Site Assessment and Mitigation Manual, dated February 2005.

2. County of San Diego, Department of Environmental Health, 1998, Hazardous Materials Management Division Underground Tank Removal/Closure Report, Establishment #H03764, Dulzura Union School District, 14581 Lyons Valley Road, dated January 5, 1999.

3. County of San Diego, Department of Environmental Health, 1999, Workplan Approval, Unauthorized Release #H03764-002, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, dated May 27, 1999.

4. Hargrave Environmental Consulting, 1999, Site Assessment Investigation - Drill, Install and Sample Four Soil Borings and Three Groundwater Monitoring Wells, and Associated Tasks, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, California, DEH Case No. H03764-002, dated December 1, 1999.

5. Hargrave Environmental Consulting, 2000a, Site Assessment Investigation - Drill, Install and Sample Two Soil Borings and Two Groundwater Monitoring Wells, and Associated Tasks, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, California, DEH Case No. H03764-002, dated May 12, 2000.

6. Hargrave Environmental Consulting, Inc., 2000b, Report of Environmental Site Assessment Investigation, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated September 7, 2000.

7. Hargrave Environmental Consulting, Inc., 2000c, Report of Interim Remedial Action, Excavation of Hydrocarbon Impacted Soils, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated September 29, 2000.

8. Hargrave Environmental Consulting, Inc., 2000d, Report of First Quarterly Groundwater Monitoring and Sampling Following

Excavation of Hydrocarbon Impacted Soils, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated December 11, 2000.

9. Hargrave Environmental Consulting Inc., 2001a, Report of Second Quarterly Groundwater Monitoring and Sampling, 11/1/00 to 2/5/01, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated February 20, 2001.

10. Hargrave Environmental Consulting, Inc., 2001b, Report of Third Quarterly Groundwater Monitoring and Sampling, 2/6/01 to 5/18/01, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated June 8, 2001.

11. Hargrave Environmental Consulting, Inc., 2001c, Report of Fourth Quarterly Groundwater Monitoring and Sampling, 5/19/01 to 8/24/01, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated September 17, 2001.

12. Hargrave Environmental Consulting, Inc., 2002a, Report of Fifth Quarterly Groundwater Monitoring and Sampling, 8/25/01 to 12/7/01, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated January 2, 2002.

13. Hargrave Environmental Consulting, Inc., 2002b, Addendum to Report of Interim Remedial Action, Report of Sensitive Receptor Survey, Jamul-Dulzura Union School District Transportation Yard, 14581 Lyons Valley Road, Jamul, California, DEH File No. H03764-002, dated January 7, 2002.

14. Hargrave Environmental Consulting, Inc., 2002c, Report of Sixth Quarterly Groundwater Monitoring and Sampling, 12/8/01 to 3/6/02, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated April 18, 2002.

15. Hargrave Environmental Consulting, Inc., 2002d, Report of Seventh Quarterly Groundwater Monitoring and Sampling, 3/7/02 to 9/27/02, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated November 4, 2002.

16. Hargrave Environmental Consulting, Inc., 2003a, Site Assessment Report - Deepening Three Existing Groundwater Monitoring Wells, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated January 13, 2003.

17. Hargrave Environmental Consulting, Inc., 2003b, Report of Eighth Quarterly Groundwater Monitoring and Sampling, 9/28/02 to 3/19/03, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated April 14, 2003.

18. Hargrave Environmental Consulting, Inc., 2003c, Site Assessment Report, Installation and Sampling of One Additional Groundwater Monitoring Well, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated August 27, 2003.

19. Hargrave Environmental Consulting, Inc., 2003d, Report of Ninth Quarterly Groundwater Monitoring and Sampling, 3/20/03 to 9/10/03, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated October 6, 2003.

20. Hargrave Environmental Consulting, Inc., 2004, Report of Tenth Quarterly Groundwater Monitoring and Sampling, 9/11/03 to 3/23/04, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated April 16, 2004.

21. Hargrave Environmental Consulting, Inc., 2005a, Site Assessment Report, Installation of One Additional Groundwater Monitoring Well and Sampling of all Existing Wells, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated January 6, 2005.

22. Hargrave Environmental Consulting, Inc., 2005b, Report of Twelfth Quarterly Groundwater Monitoring and Sampling, 12/10/05 to 6/27/05, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, Jamul, California, DEH Case No. H03764-002, dated July 14, 2005.

23. Secor International, Inc., 1999, Work Plan for Site Assessment, Jamul-Dulzura Union School District, 14581 Lyons Valley Road, California, dated May 10, 1999.

Project No. 267.1.19
8/10/2004

TABLE I
WELL CONSTRUCTION DETAILS

WELL DETAILS	MW-1#	MW-2#	MW-3#	MW-4*	MW-5	MW-6	MW-7	MW-8	MW-9	I-1	I-2	I-3
TOTAL DEPTH	44	44	47	35	35	40	40	43	45	240	80	420
CASING DIAMETER	2 in	2 in	2 in	2 in	2 in	2 in	2 in	2 in	2 in	-	-	-
WELL SCREEN	24-44	24-44	27-47	15-35	15-35	10-40	10-40	23-43	25-45	-	-	-
SOLID CASING	0-24	0-24	0-27	0-15	0-15	0-10	0-10	0-23	0-25	-	-	-
GRAVEL PACK (#3 SAND)	22-44	22-44	24-47	12-35	13-35	8-40	8-40	21-43	23-45	-	-	-
BENTONITE SEAL	3-22	3-22	3-24	2-12	2-13	2-8	2-8	3-21	3-23	-	-	-
SURFACE SEAL (CONCRETE)	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-3	0-3	-	-	-
DATE COMPLETED	11/26/02	11/26/02	11/26/02	04/04/00	04/04/00	08/08/00	08/08/00	07/28/03	11/23/04	-	-	-

* Well destroyed on 8/28/00
# Wells deepened on 11/26/02
- = not applicable/not known

TABLE II

SUMMARY OF GROUNDWATER MONITORING DATA

WELL ID	DATE SAMPLED	GW DEPTH	GW ELEVATION (ft above MSL)	TPHg (ppm)	TPHd (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	TBA (ppb)	MTBE (ppb)	NAPHT-HALENE (ppb)
MW-1	08/06/99	25.12	1132.38#	<0.050	<500	<0.3	<0.3	<0.3	<0.6	-	-	-	-	135	NA
	10/29/99	28.41	1129.09#	<0.050	<500	<0.3	<0.3	<0.3	<0.6	-	-	-	-	50.5	NA
	04/13/00	27.91	1129.59#	0.125	<500	<0.5	<0.5	<0.5	<1.0	-	-	-	-	117	NA
	11/01/00	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	02/05/01	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	05/18/01	28.02	1129.48#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	128	NA
	08/24/01	31.12	1126.38#	-	-	-	-	-	-	-	-	-	-	-	NA
	12/07/01	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
(1147.30)*	03/06/02	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	09/27/02	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
(1147.37)*	12/05/02	36.24	1111.13	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	18.0	NA
	03/19/03	32.60	1114.77	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	55.9	14.2	NA
	07/31/03	33.62	1113.75	-	-	-	-	-	-	-	-	-	-	-	NA
	09/10/03	34.64	1112.73	0.024	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	60.0	NA
	03/23/04	33.22	1114.15	0.049	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	42.1	NA
	12/09/04	31.17	1116.20	0.058	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	71.2	NA
	06/27/05	**15.47**	**1131.90**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**28.1**	**<0.5**
MW-2	10/29/99	30.49	1129.51#	<0.050	<500	<0.3	<0.3	<0.3	<0.6	-	-	-	-	<2.0	NA
	04/13/00	29.92	1130.08#	0.040	<500	<0.5	<0.5	<0.5	<1.0	-	-	-	-	33.9	NA
	11/01/00	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	02/05/01	34.31	1125.69#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	1.7	NA
	05/18/01	29.76	1130.24#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	10.2	NA
	08/24/01	34.25	1125.75#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	9.0	NA
	12/07/01	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
(1149.78)*	03/06/02	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	09/27/02	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
(1149.54)*	12/05/02	38.12	1111.42	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	2.6	NA
	03/19/03	33.75	1115.79	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	0.7J	NA
	07/31/03	35.31	1114.23	-	-	-	-	-	-	-	-	-	-	-	NA
	09/10/03	36.35	1113.19	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	0.7J	NA
	03/23/04	34.86	1114.68	0.014	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	11.6	NA
	12/09/04	32.42	1117.12	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	1.4	NA
	06/27/05	**16.63**	**1132.91**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**<0.5**	**<0.5**
MW-3	10/12/99	30.36	1129.44#	<0.050	<500	0.3	<0.3	<0.3	<0.6	-	-	-	-	221	NA
	04/13/00	29.82	1130.13#	2.93	<500	<0.5	<0.5	<0.5	<1.0	-	-	-	-	2,670	NA
	11/01/00	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	02/05/01	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	05/18/01	29.31	1130.64#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	6.4	31.8	<50	3,490	NA
	08/24/01	33.99	1125.70#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	4.7	8.2	<50	1,840	NA

TABLE II

SUMMARY OF GROUNDWATER MONITORING DATA

WELL ID	DATE SAMPLED	GW DEPTH	GW ELEVATION (ft above MSL)	TPHg (ppm)	TPHd (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	TBA (ppb)	MTBE (ppb)	NAPHT-HALENE (ppb)
MW-3	12/07/01	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
(1149.55)*	03/06/02	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	09/27/02	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
(1149.50)*	12/05/02	38.20	1111.3	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	1.4	15.2	279	1,610	NA
	03/19/03	34.08	1115.42	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	1.1	11.4	6,030	1,500	NA
	07/31/03	35.36	1114.14	-	-	-	-	-	-	-	-	-	-	-	NA
	09/10/03	36.36	1113.14	0.394	-	<0.5	<0.5	<0.5	<1.0	<0.5	1.4	7.7	55.0	1,270	NA
	03/23/04	34.90	1114.60	0.765	-	<0.5	<0.5	<0.5	<1.0	<0.5	0.8J	4.5	288	808	NA
	12/09/04	32.76	1116.74	0.623	-	<0.5	<0.5	<0.5	<1.0	<0.5	1.2	8.1	<10	931	NA
	06/27/05	**16.40**	**1133.10**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**1.7**	**<10**	**268**	**<0.5**
MW-4	04/13/00	28.61	1129.72#	245	<500	<0.5	<0.5	<0.5	<1.0	-	-	-	-	217	NA
MW-5	04/13/00	28.20	1129.40#	5.68	<500	<0.5	<0.5	<0.5	<1.0	-	-	-	-	5,390	NA
	11/01/00	33.43	1124.17#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	6.1	<50	1,230	NA
	02/05/01	32.12	1125.48#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	4.4	<50	796	NA
	05/18/01	28.28	1129.32#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	8.5	<50	1,140	NA
	08/24/01	32.42	1125.18#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	3.9	<50	970	NA
	12/07/01	34.12	1123.48#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	2.1	<50	690	NA
(1147.37)*	03/06/02	33.23	1,114.14	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	2.7	<10	695	NA
	09/27/02	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	12/05/02	NO GW	NO GW	-	-	-	-	-	-	-	-	-	-	-	NA
	03/19/03	32.75	1,114.62	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	1.5	709	180	NA
	07/31/03	33.72	1,113.65	-	-	-	-	-	-	-	-	-	-	-	NA
	09/10/03	34.71	1,112.66	-	-	-	-	-	-	-	-	-	-	-	NA
	03/23/04	33.31	1,114.06	0.256	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	0.9J	49.0J	347	NA
	12/09/04	31.44	1,115.93	0.541	-	<0.5	<0.5	<0.5	<1.0	<0.5	0.7J	3.8	17.3J	677	NA
	06/27/05	**15.91**	**1,131.46**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**1.6**	**<10**	**284**	**<0.5**
MW-6	08/14/00	30.78	1124.50#	0.199	<500	<0.5	<0.5	<0.5	<1.5	-	-	-	-	315	NA
	11/01/00	31.52	1123.76#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	1.6	<50	421	NA
	02/05/01	30.05	1125.23#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	1.0	<50	266	NA
	05/18/01	26.63	1128.65#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	142	NA
	08/24/01	30.70	1124.58#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	1.1	<50	288	NA
	12/07/01	32.19	1123.09#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	265	NA
(1145.07)*	03/06/02	31.26	1,113.81	-	-	<0.5	0.5J	<0.5	<1.0	<0.5	<0.5	1.0	<10	300	NA
	09/27/02	34.07	1,111.00	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	163	NA
	12/05/02	34.31	1,110.76	-	-	-	-	-	-	-	-	-	-	-	NA
	03/19/03	30.87	1,114.20	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	216	57.2	NA
	07/31/03	31.99	1,113.08	-	-	-	-	-	-	-	-	-	-	-	NA
	09/10/03	32.93	1,112.14	0.041	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	107	NA
	03/23/04	31.51	1,113.56	0.046	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	36.3	NA

TABLE II

SUMMARY OF GROUNDWATER MONITORING DATA

WELL ID	DATE SAMPLED	GW DEPTH	GW ELEVATION (ft above MSL)	TPHg (ppm)	TPHd (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	TBA (ppb)	MTBE (ppb)	NAPHT-HALENE (ppb)
MW-6	12/09/04	29.85	1,115.22	0.024	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	22.5	NA
	06/27/05	**15.06**	**1,130.01**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**2.0**	**<0.5**
MW-7	08/14/00	36.93	1122.58#	<0.005	<500	<0.5	<0.5	<0.5	<1.5	-	-	-	-	<0.5	NA
	11/01/00	38.07	1121.44#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	02/05/01	35.22	1124.29#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	05/18/01	17.37	1142.14#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	08/24/01	31.23	1128.28#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	12/07/01	35.48	1124.03#	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
(1149.29)*	03/06/02	31.18	1,118.11	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	09/27/02	39.17	1,110.12	-	-	<0.5	<0.5	0.8J	2.8	<0.5	<0.5	<0.5	<10	<0.5	NA
	12/05/02	NO GW	NO GW	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	NA
	03/19/03	30.03	1,119.26	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	07/31/03	34.91	1,114.38	-	-	-	-	-	-	-	-	-	-	-	NA
	09/10/03	33.55	1,115.74	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	03/23/04	28.65	1,120.64	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	12/09/04	29.64	1,119.65	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	06/27/05	**10.99**	**1,138.30**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**<0.5**	**<0.5**
MW-8	07/31/03	30.59	1,113.31	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
(1143.90)*	09/10/03	31.57	1,112.33	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	03/23/04	30.10	1,113.80	<0.005	-	1.0	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	12/09/04	28.58	1,115.32	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	06/27/05	**14.01**	**1,129.89**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**<0.5**	**<0.5**
MW-9	12/09/04	30.03	1,115.70	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
(1145.73)*	**06/27/05**	**15.06**	**1,130.67**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**<0.5**	**<0.5**
I-1	06/09/00	NM	NM	<0.010	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	11/01/00	NM	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	02/05/01	NM	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	05/18/01	38.48	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	08/24/01	78.62	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	12/07/01	52.31	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
(1152.48)*	03/06/02	36.80	1,115.68	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	09/27/02	>200ft	NA	-	-	<0.5	<0.5	<0.5	2.8	<0.5	<0.5	<0.5	<10	<0.5	NA
	03/19/03	36.41	1,116.07	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	07/31/03	>200ft	NA	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	NA
	09/10/03	103.82	1,048.66	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	03/23/04	96.28	1,056.20	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	09/10/04	83.18	1,069.30	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	06/27/05	**18.12**	**1,134.36**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**<0.5**	**<0.5**
I-2	06/09/00	NM	NM	<0.010	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA

TABLE II

SUMMARY OF GROUNDWATER MONITORING DATA

WELL ID	DATE SAMPLED	GW DEPTH	GW ELEVATION (ft above MSL)	TPHg (ppm)	TPHd (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	TBA (ppb)	MTBE (ppb)	NAPHT-HALENE (ppb)
I-2	11/01/00	NM	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	02/05/01	NM	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	05/18/01	19.65	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	08/24/01	37.06	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	12/07/01	38.64	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
(1155.18)*	03/06/02	34.92	1120.26	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	09/27/02	42.88	1112.30	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	03/19/03	34.04	1121.14	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	07/31/03	42.87	1112.31	-	-	-	-	-	-	-	-	-	-	-	NA
	09/10/03	36.03	1119.15	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	03/23/04	31.95	1123.23	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	12/09/04	33.02	1122.16	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	06/27/05	**13.21**	**1141.97**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**<0.5**	**<0.5**
I-3	06/09/00	NM	NM	0.017	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	11/01/00	NM	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	02/05/01	NM	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	05/18/01	26.54	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	08/24/01	59.25	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
	12/07/01	37.50	NM	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<50	<0.5	NA
(1142.31)*	03/06/02	33.85	1108.46	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	09/27/02	>200ft	NA	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<30	<0.5	NA
	03/19/03	33.35	1108.96	-	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	07/31/03	>200ft	NA	-	-	-	-	-	-	-	-	-	-	-	NA
	09/10/03	85.02	1057.29	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	03/23/04	77.85	1064.46	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	12/09/04	64.08	1078.23	<0.005	-	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	NA
	06/27/05	**11.95**	**1130.36**	**<0.005**	**-**	**<0.5**	**<0.5**	**<0.5**	**<1.0**	**<0.5**	**<0.5**	**<0.5**	**<10**	**<0.5**	**<0.5**

- = Not Analyzed
* = Elevation of top of well casing (TOC) in feet above mean sea level (MSL) surveyed 3/29/02, 12/5/02, 8/4/03 and 12/15/04 by Hirsch & Company, a licensed surveyor. Elevation of irrigation wells is from rim of well head.
# = Groundwater elevation in feet relative to a temporary benchmark.
NM = Not Measured
NA = Not Applicable

TABLE III
SUMMARY OF SOIL SAMPLE ANALYSES

SAMPLE I.D.	TPH-G (ppm)	TPH-D (ppm)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)
12/1/1998							
T2S-14	11.0	29.0	-	-	-	-	-
T2N-14	62.0	9,200	-	-	-	-	-
T1S-14	190.0	<10	-	-	-	-	-
TIN-14	<10	<10	-	-	-	-	-
D1	94.0	650.0	-	-	-	-	-
8/3/1999							
B-1, S-10	<1.0	<10	<5	<5	<10	<5	99
B-1, S-13	<1.0	<10	<5	<5	<10	<5	52
B-2, S-7.5	2.9	7,020	7	10	220	41	<20
B-2, S-10.5	4.0	3,270	<5	<5	119	225	<20
B-3, S-10	<1.0	<10	<5	<5	<5	<10	<20
B-3, S-14	<1.0	<10	<5	<5	<5	<10	<20
MW-1, S-7.5	<1.0	<10	<5	<5	<5	<10	<20
MW-1, S-10.5	<1.0	115	<5	<5	<5	<10	<20
MW-1, S-15	<1.0	<10	<5	<5	<5	<10	<20
MW-1, S-20	<1.0	60	<5	<5	<5	<10	<20
MW-1, S-25	<1.0	<10	<5	<5	<5	<10	<20
HA-1, S-2	<1.0	<10	<5	<5	<5	<10	<20
10/25/1999							
MW-2, S-15	<1.0	<10	<5	<5	<5	<10	<20
MW-2, S-20	<1.0	<10	<5	<5	<5	<10	<20
MW-2, S-25	<1.0	<10	<5	<5	<5	<10	<20
MW-2, S-30	<1.0	<10	<5	<5	<5	<10	<20
MW-2, S-35	<1.0	<10	<5	<5	<5	<10	<20
MW-3, S-15	<1.0	16	<5	<5	<5	<10	90
MW-3, S-20	<1.0	<10	<5	<5	<5	<10	<20
MW-3, S-25	<1.0	<10	<5	<5	<5	<10	<20
MW-3, S-30	<1.0	<10	<5	<5	<5	<10	<20
MW-3, S-35	<1.0	<10	<5	<5	<5	<10	<20
4/4/2000							
MW-4,5	2.1	3,060	<5	11.2	92.4	220	15.2
MW-4,10	5.7	10,200	<5	26	21.8	62.6	84
MW-4,15	<1.0	<10	<5	<5	<5	<10	25.2
MW-4,20	<1.0	<10	<5	<5	<5	<10	<10
MW-4,25	<1.0	<10	<5	<5	<5	<10	<10
MW-4,30	<1.0	<10	<5	<5	<5	<10	<10
MW-4,35	<1.0	<10	<5	<5	<5	<10	<10
MW-5,5	<1.0	55	<5	<5	<5	<10	<10
MW-5,10	<1.0	<10	<5	<5	<5	<10	<10
MW-5,15	<1.0	<10	<5	<5	<5	<10	22
MW-5,20	<1.0	<10	<5	<5	<5	<10	<10
MW-5,25	<1.0	<10	<5	<5	<5	<10	<10
MW-5,30	<1.0	<10	<5	<5	<5	<10	68.6
MW-5,35	<1.0	<10	<5	<5	<5	<10	<10
B-4,5	<1.0	<10	<5	<5	<5	<5	<10

TABLE III
SUMMARY OF SOIL SAMPLE ANALYSES

SAMPLE I.D.	TPH-G (ppm)	TPH-D (ppm)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)
B-4,10	2.2	1,050	<5	10	10	80	288
B-4,15	<1.0	<10	<5	<5	<5	<10	52
B-4,20	<1.0	<10	<5	<5	<5	<10	71
B-4,25	<1.0	<10	<5	<5	<5	<10	<10
B-4,30	<1.0	<10	<5	<5	<5	<10	<10
B-5,18	3.9	2,490	63.2	100	67.6	180	30
B-5,23	<1.0	<10	<5	<5	<5	<10	<10
B-5,28	<1.0	<10	<5	<5	<5	<10	29
B-5,33	<1.0	<10	<5	<5	<5	<10	76
B-5,38	<1.0	<10	<5	<5	<5	<10	<10
8/8/2000							
MW-6,28	<1.0	<10	<5	<5	<5	<10	<10
MW-7,29	<1.0	<10	<5	<5	<5	<10	<10
B-6,5	<1.0	<10	<5	<5	<5	<10	<10
B-6,10	<1.0	<10	<5	<5	<5	<10	<10
B-6,15	<1.0	<10	<5	<5	<5	<10	<10
B-6,20	<1.0	<10	<5	<5	<5	<10	<10
B-6,25	<1.0	<10	<5	<5	<5	<10	<10
B-6,30	<1.0	<10	<5	<5	<5	<10	<10
B-6,35	<1.0	<10	<5	<5	<5	<10	<10
B-6,40	<1.0	<10	<5	<5	<5	<10	<10
Excavation							
S-1, 21'	ND	ND	-	-	-	-	-
S-2, 21'	ND	ND	-	-	-	-	-
S-3, 20'	ND	ND	-	-	-	-	-
S-4, 12'	ND	2,200	ND	45	130	96	13
S-5, 13'	ND	ND	-	-	-	-	-
S-6, 13'	ND	370	ND	ND	ND	13	19
S-7, 13'	ND	ND	-	-	-	-	-
S-8, 20'	ND	ND	-	-	-	-	-
S-9, 20'	ND	ND	-	-	-	-	-
S-10, 21'	ND	ND	-	-	-	-	-
S-11, 21'	ND	ND	-	-	-	-	-
S-12, 21'	ND	ND	-	-	-	-	-
S-13, 14'	ND	ND	-	-	-	-	-
S-14, 10'	ND	ND	-	-	-	-	-
S-15, 20'	ND	ND	-	-	-	-	-
S-16, 21'	ND	ND	ND	ND	ND	ND	ND
S-17, 21'	ND	ND	-	-	-	-	-
S-18, 20'	ND	ND	-	-	-	-	-
S-19, 17.5'	ND	ND	-	-	-	-	-
S-20, 10'	ND	ND	-	-	-	-	-
S-21, 12'	ND	ND	-	-	-	-	-
S-22, 9'	ND	ND	-	-	-	-	-
S-23, 17'	ND	ND	-	-	-	-	-
S-24, 20'	ND	ND	-	-	-	-	-

TABLE III
SUMMARY OF SOIL SAMPLE ANALYSES

SAMPLE I.D.	TPH-G (ppm)	TPH-D (ppm)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)
S-25, 6.5'	ND	8,800	-	-	-	-	-
S-26, 12'	ND	13,000	11	ND	24	ND	62
S-27, 11'	ND	ND	-	-	-	-	-
S-28, 9.5'	ND	ND	-	-	-	-	-
S-30, 12'	ND	ND	-	-	-	-	-

- = Not Analyzed

TPH-G and TPH-D analyzed by EPA Method 8015

BTEX and MTBE analyzed by EPA Method 8020

MTBE confirmation by EPA 8260

All laboratory analysis performed by HP Labs, Escondido and Solana Beach, California

Project No. 267.1.19
8/10/2005

TABLE IV
DECAY ANALYSES

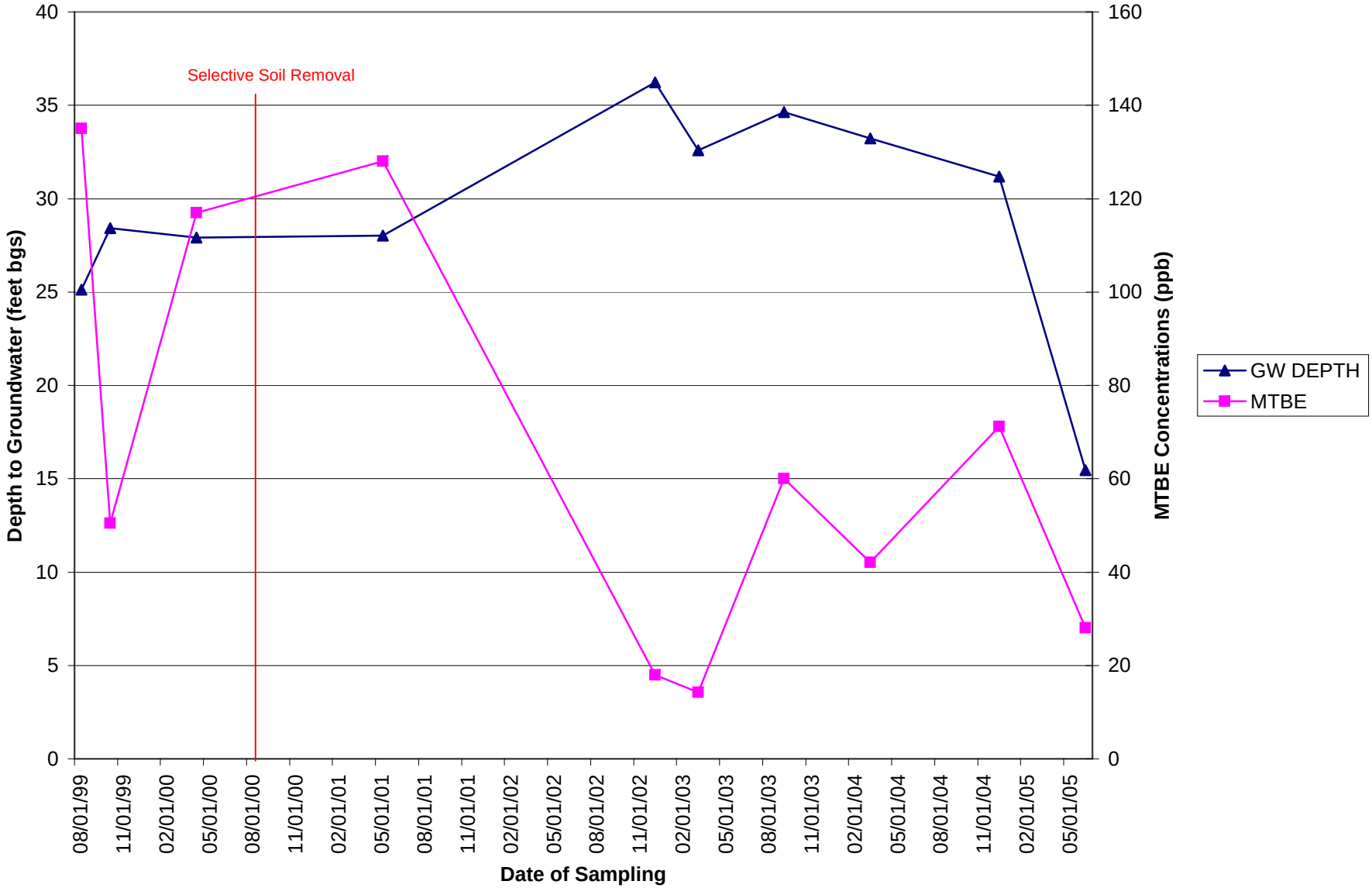
Well I.D.	C_o		C		t	k	Water Quality Goal	Time to reach goal
	Date	MTBE (ppb)	Date	MTBE (ppb)	Days	$Days^{-1}$		(yrs)
MW-1	08/06/99	135	06/27/05	28.1	2,150	-0.00073	13 ppb MTBE	2.9
MW-3	04/13/00	3,490	06/27/05	268	1,900	-0.00135	13 ppb MTBE	6.2
MW-5	04/13/00	5,390	06/27/05	284	1,900	-0.00155	13 ppb MTBE	5.5

$$C/C_o = e^{(kt)}$$

Project No. 267.1.19
8/9/05

CHART I

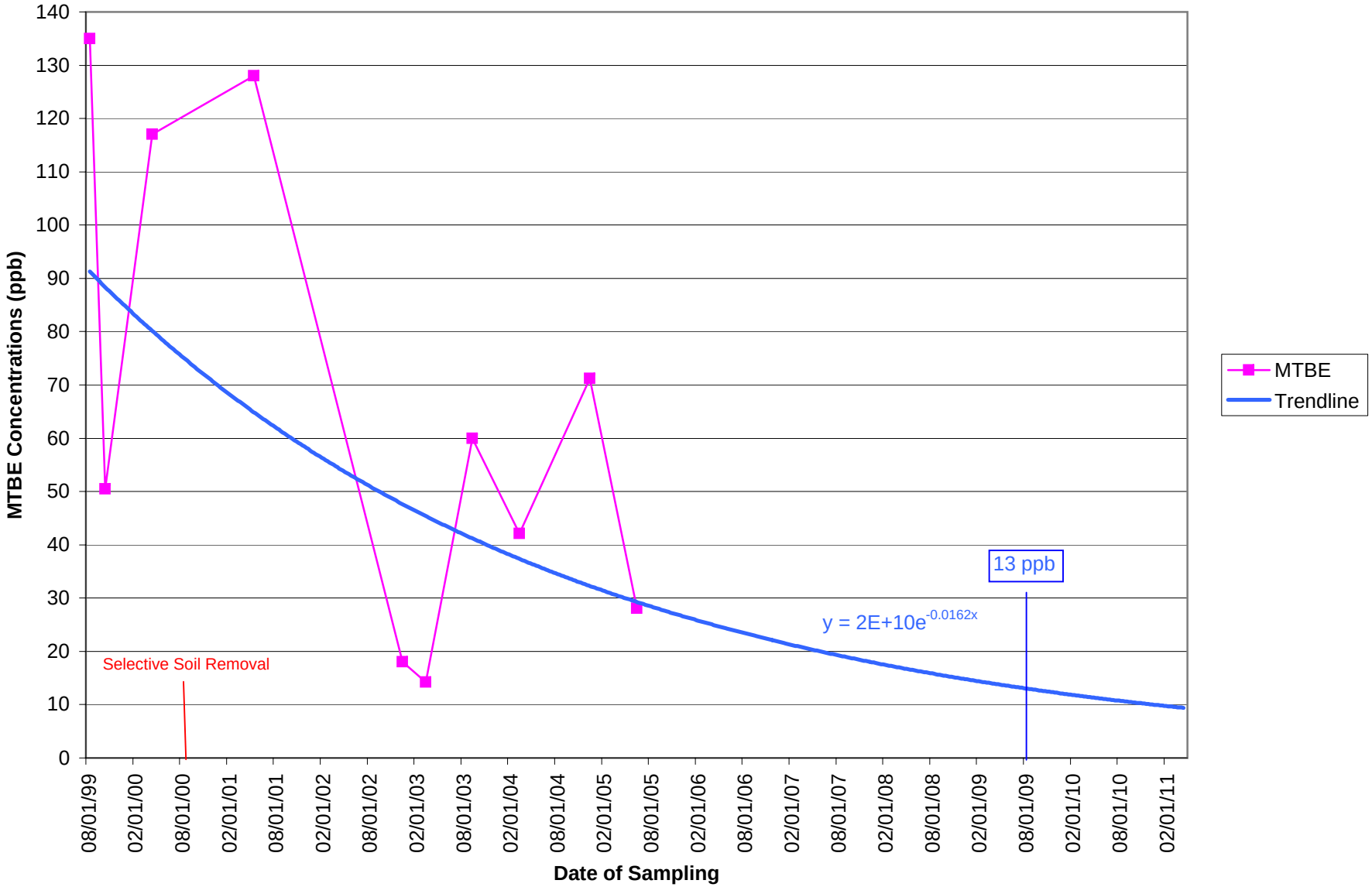
MW-1 GROUNDWATER TRENDS AND MTBE CONCENTRATIONS



Project No. 267.1.19
8/9/05

CHART II

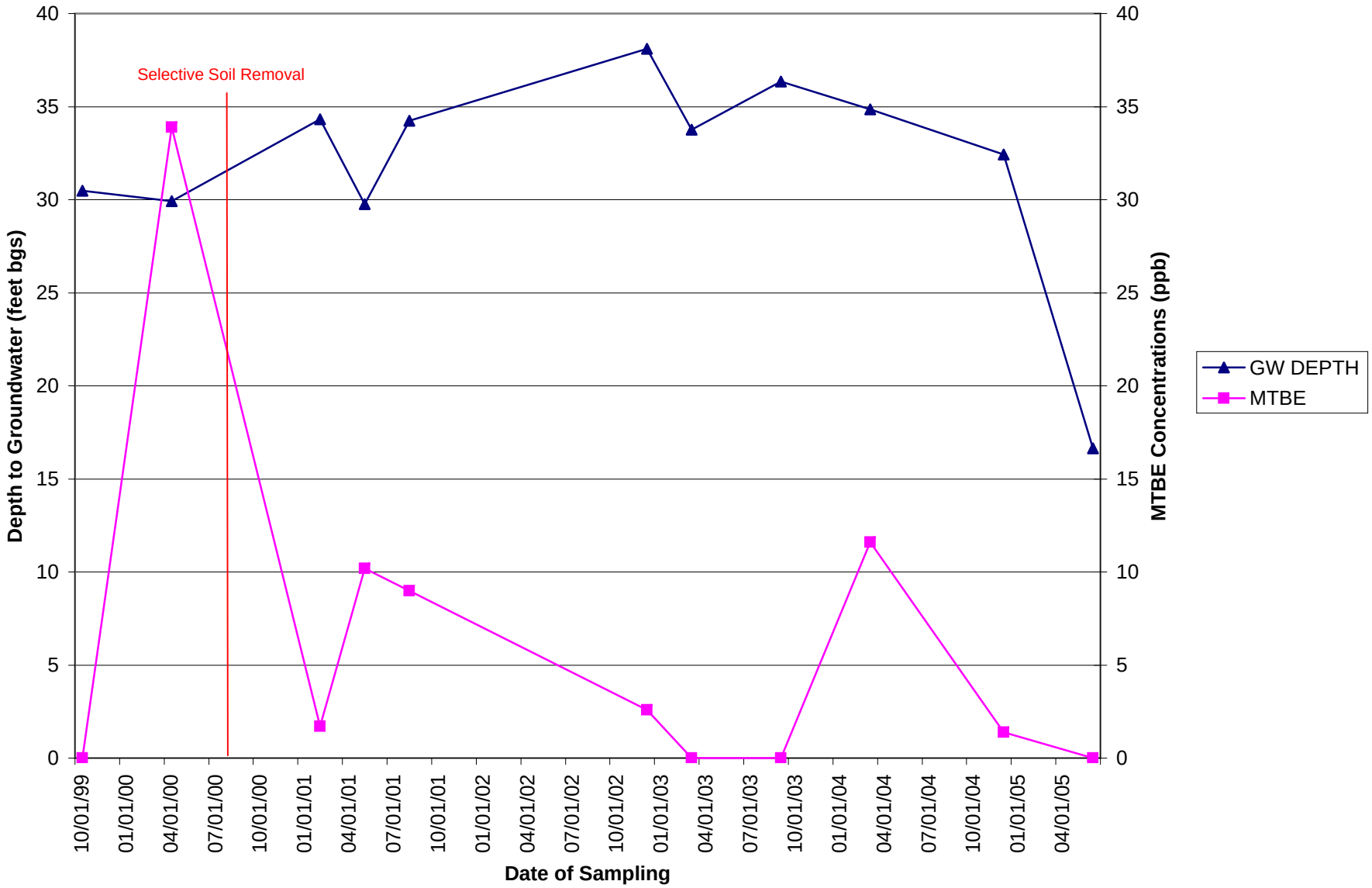
MW-1 ESTIMATED MTBE ATTENUATION



Project No. 267.1.19
8/9/05

CHART III

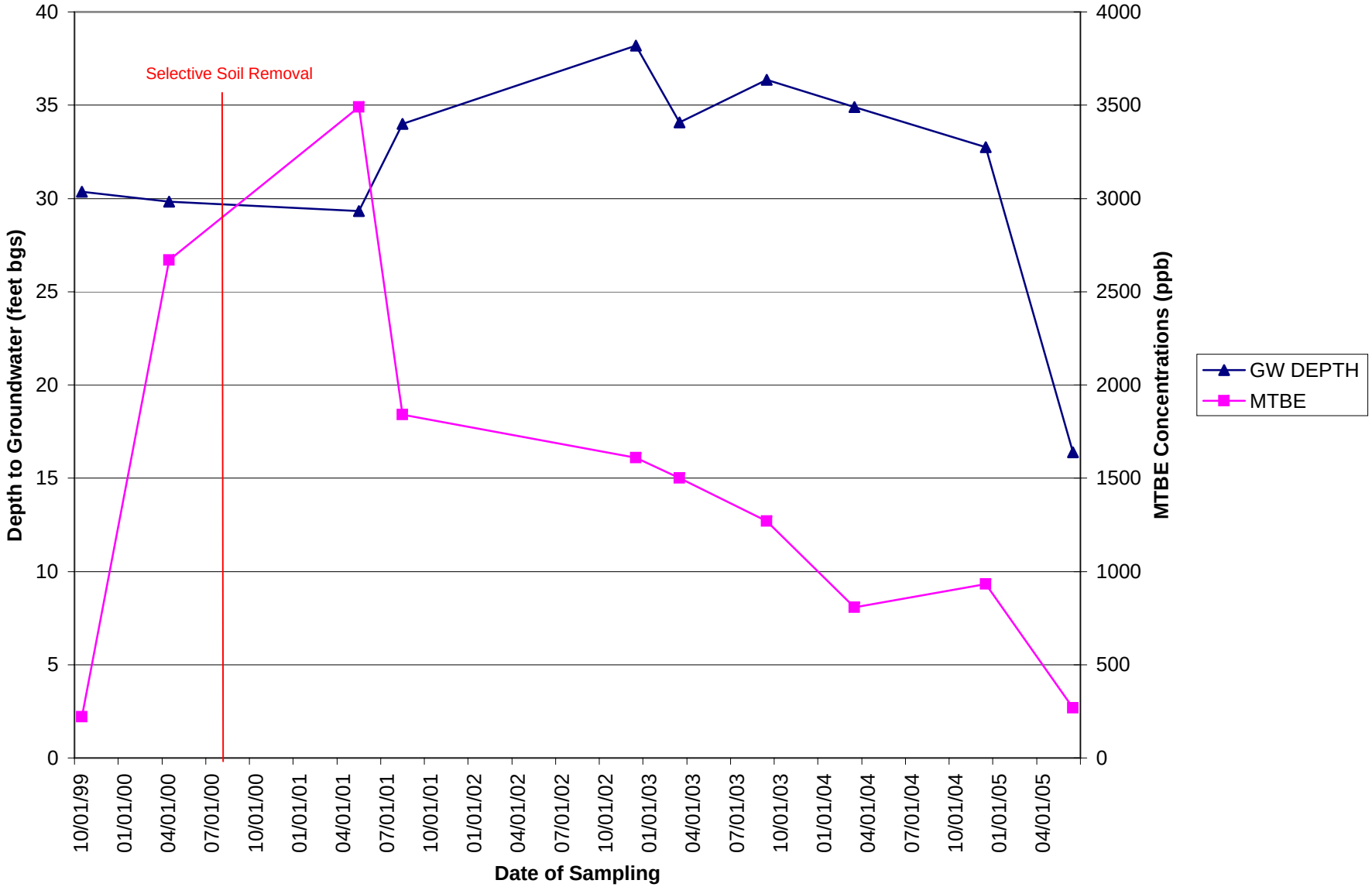
MW-2 GROUNDWATER TRENDS AND MTBE CONCENTRATIONS



Project No. 267.1.19
8/9/05

CHART IV

MW-3 GROUNDWATER TRENDS AND MTBE CONCENTRATIONS

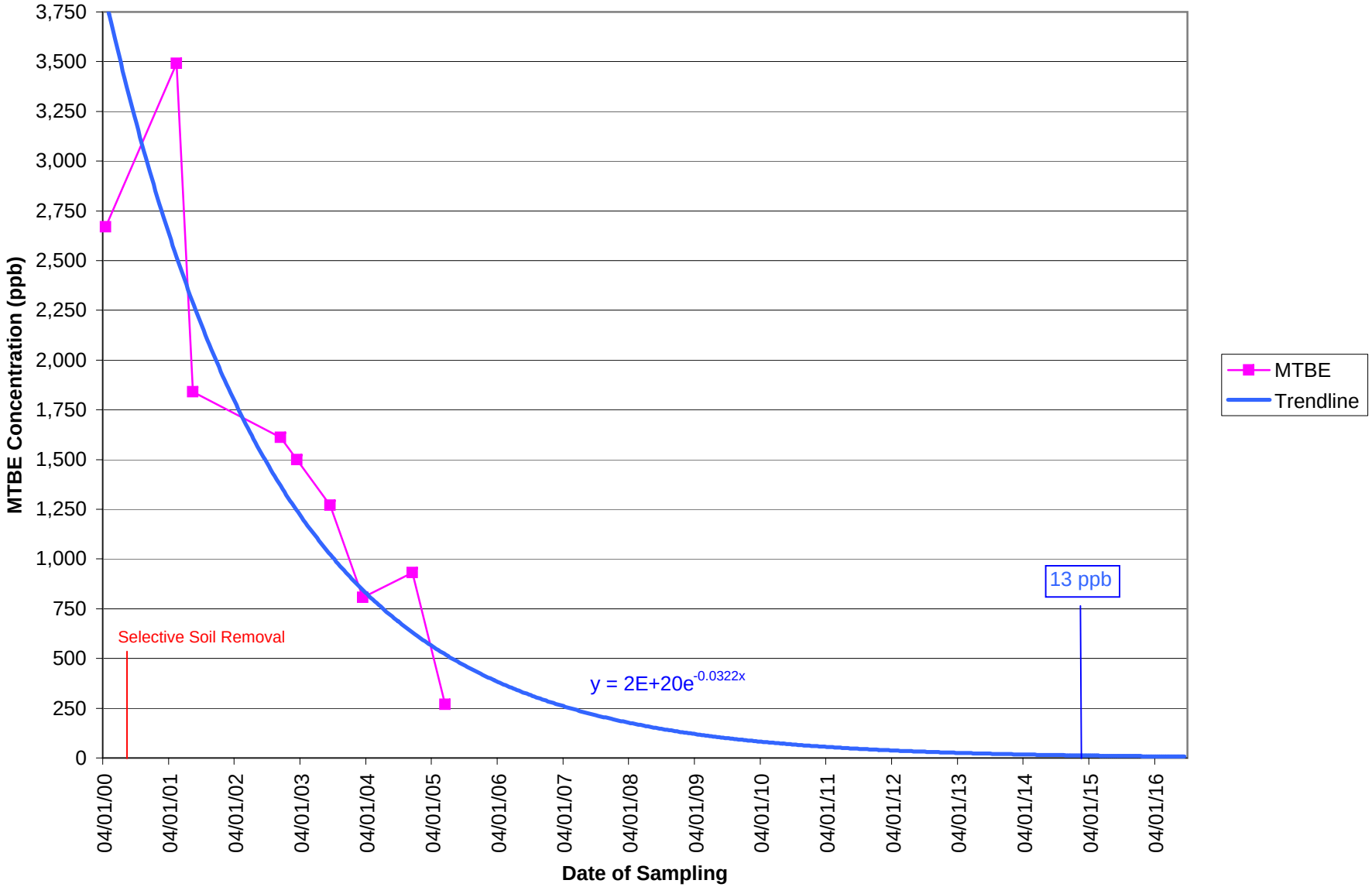


jamul/spreadsheets/gwtable/MW-3

Project No. 267.1.19
8/9/05

CHART V

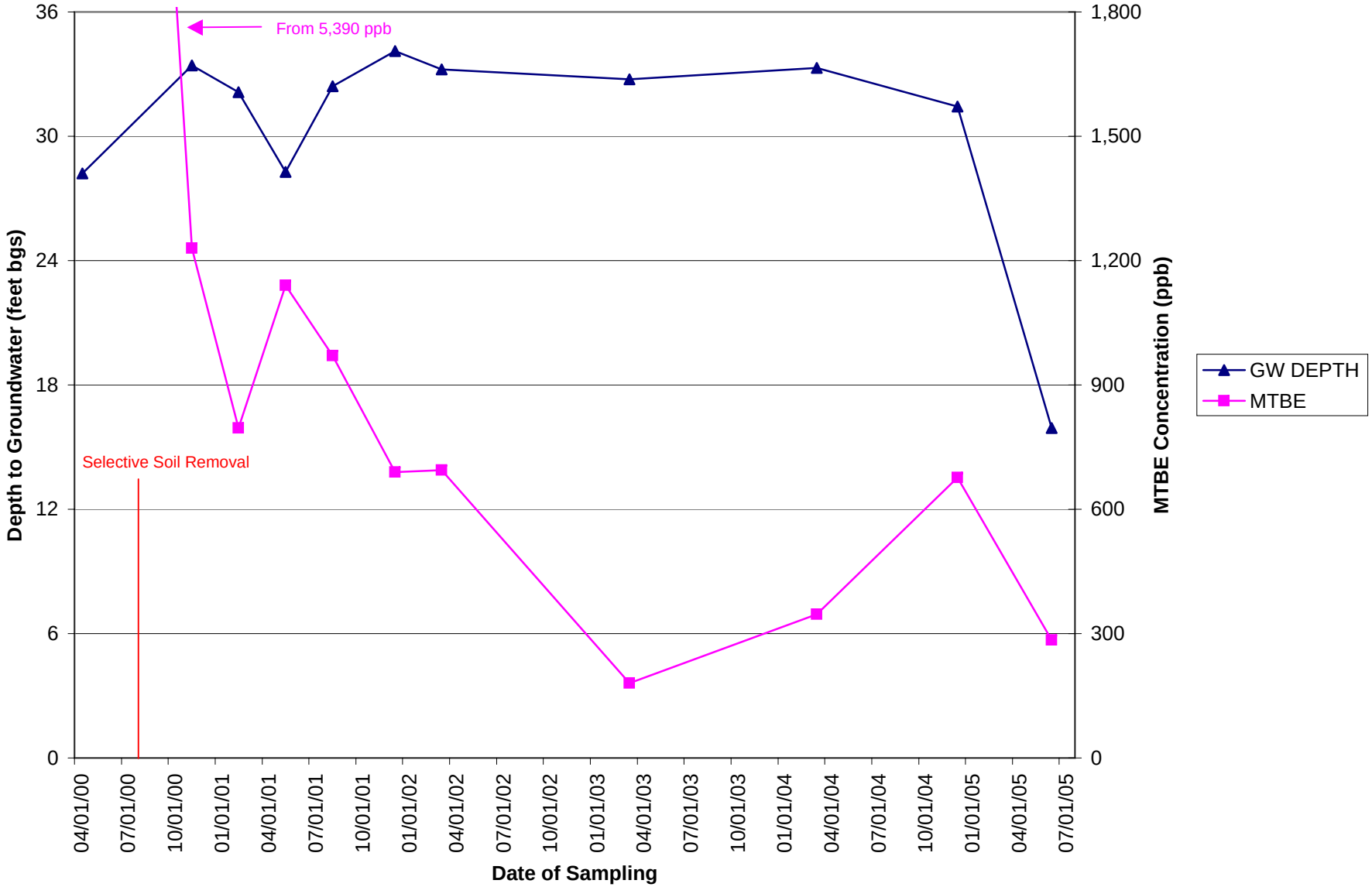
MW-3 ESTIMATED MTBE ATTENUATION



Project No. 267.1.19
8/9/05

CHART VI

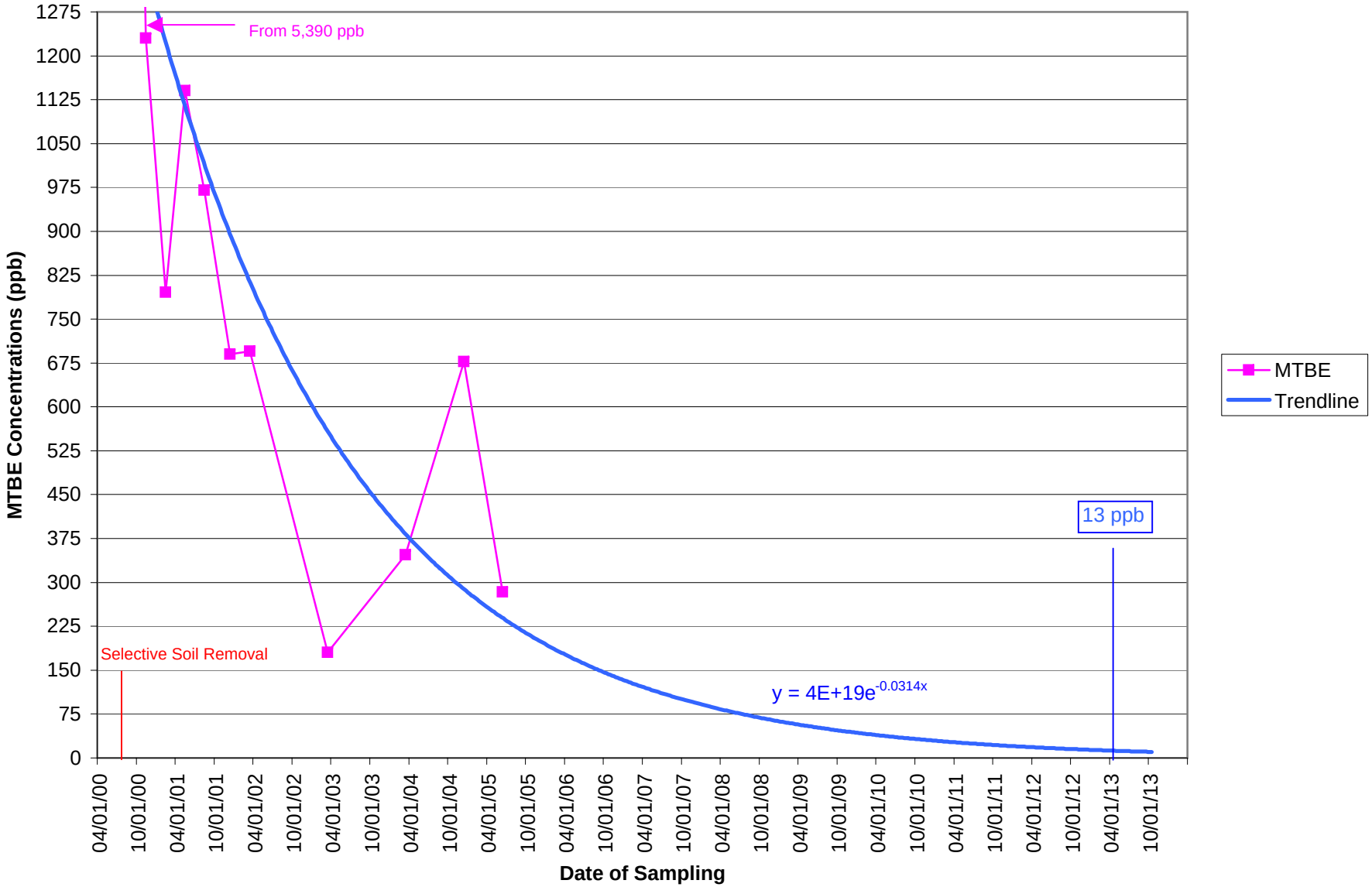
MW-5 GROUNDWATER TRENDS AND MTBE CONCENTRATIONS



jamul/spreadsheets/gwtable/MW-5

Project No. 267.1.19
8/9/05

CHART VII
MW-5 ESTIMATED MTBE ATTENUATION



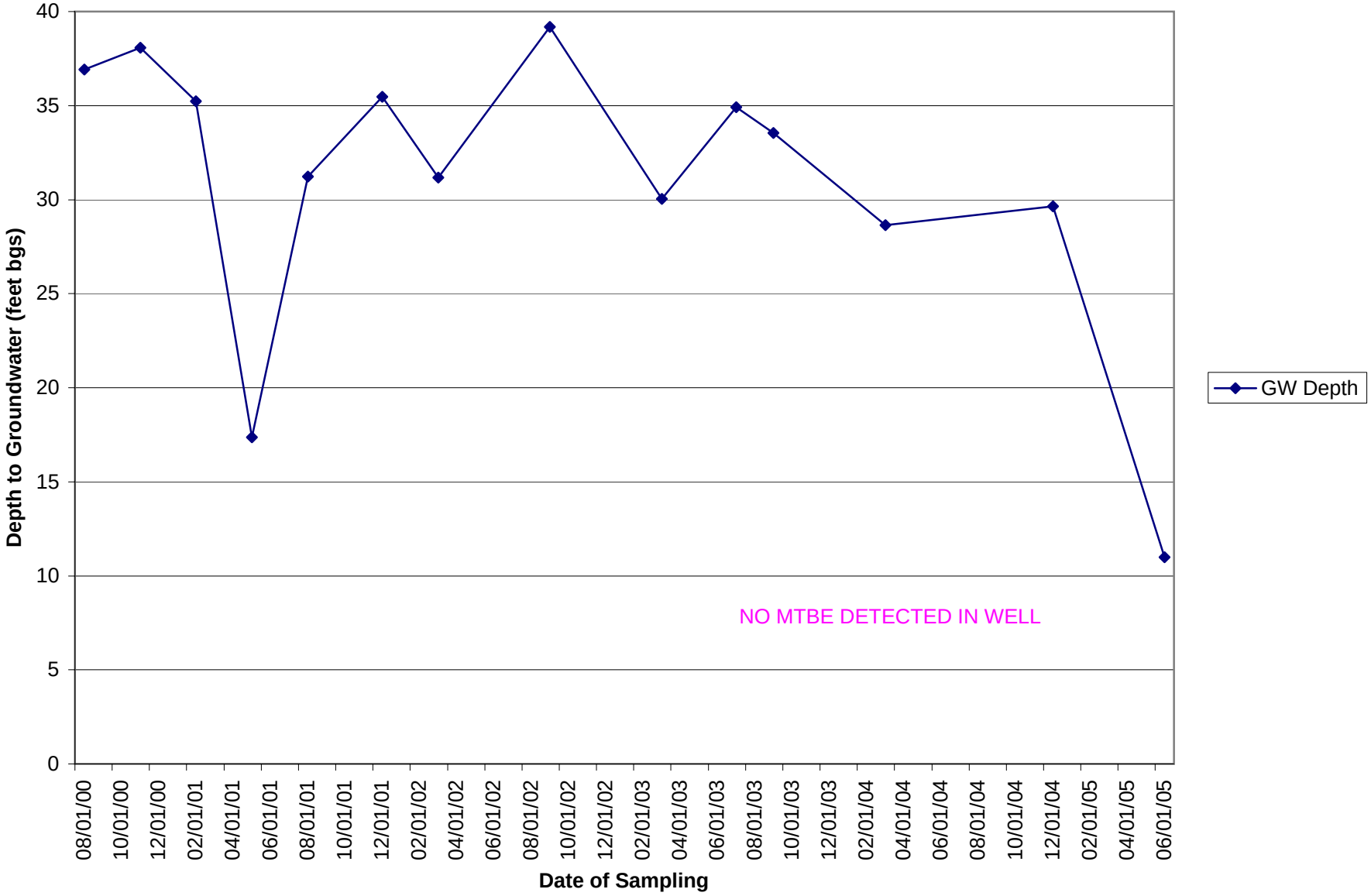
Project No. 267.1.19
8/9/05

CHART VIII

MW-6 GROUNDWATER TRENDS AND MTBE CONCENTRATIONS

Project No. 267.1.19
8/9/05

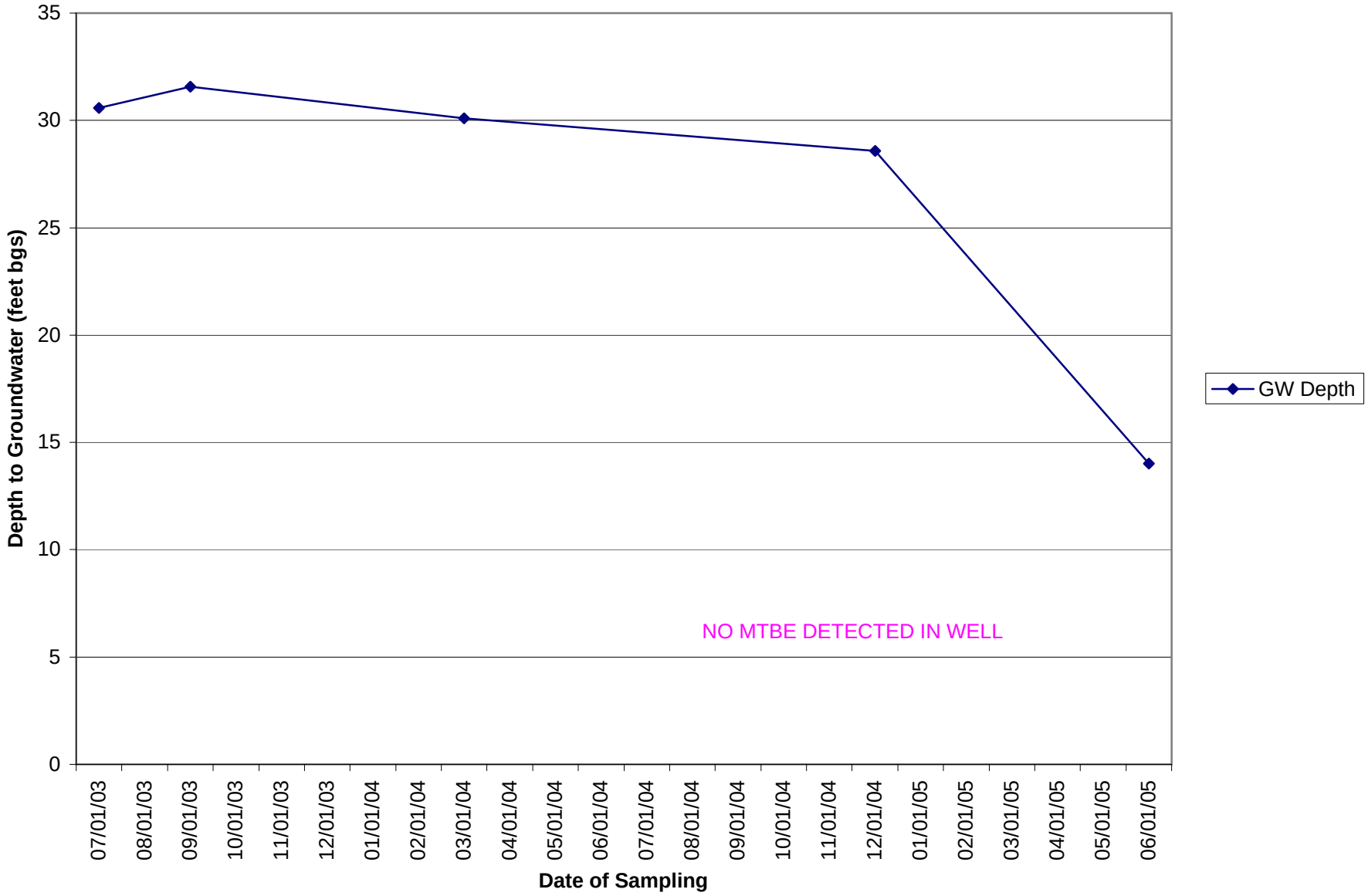
CHART IX
MW-7 GROUNDWATER TRENDS

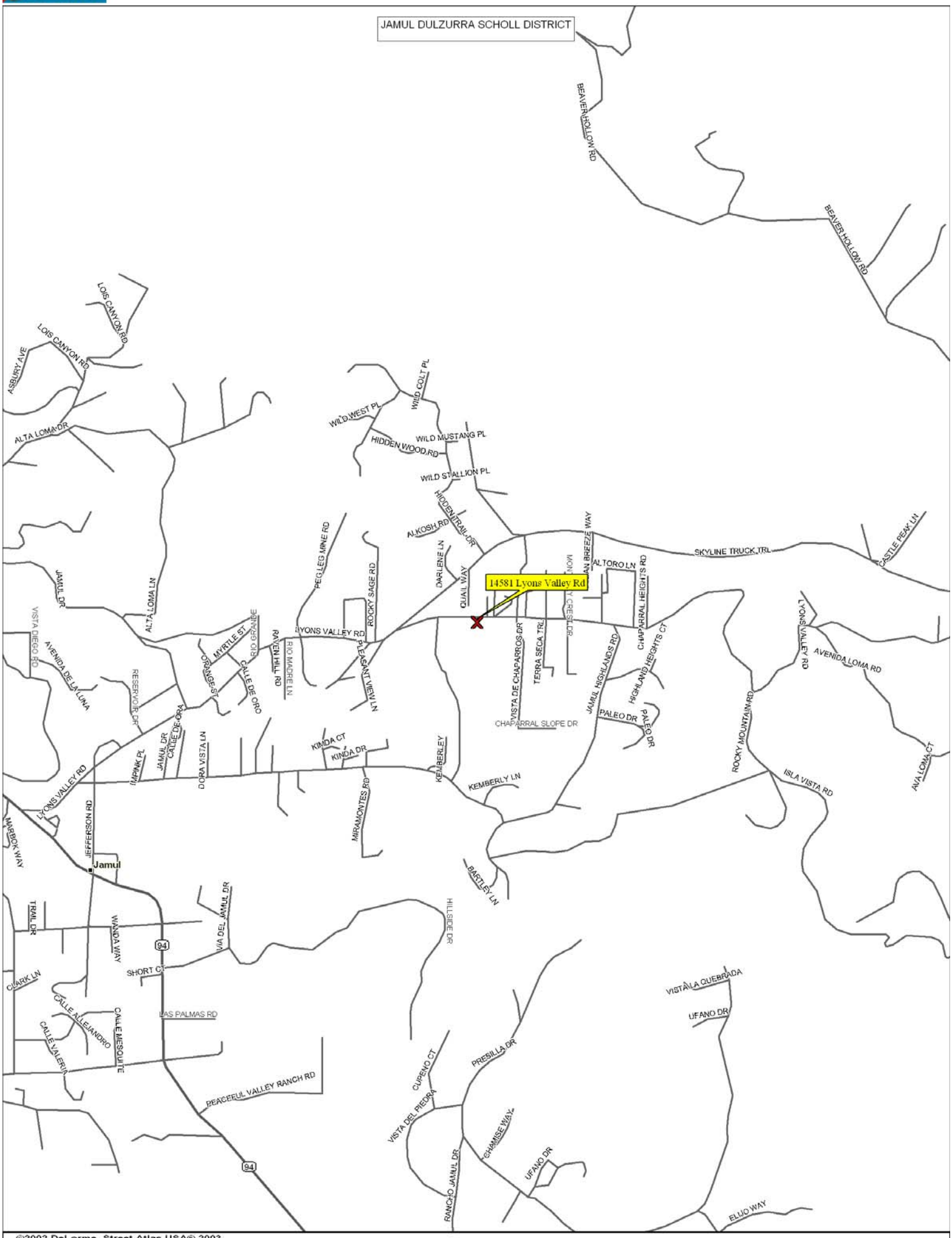


Project No. 267.1.19
8/9/05

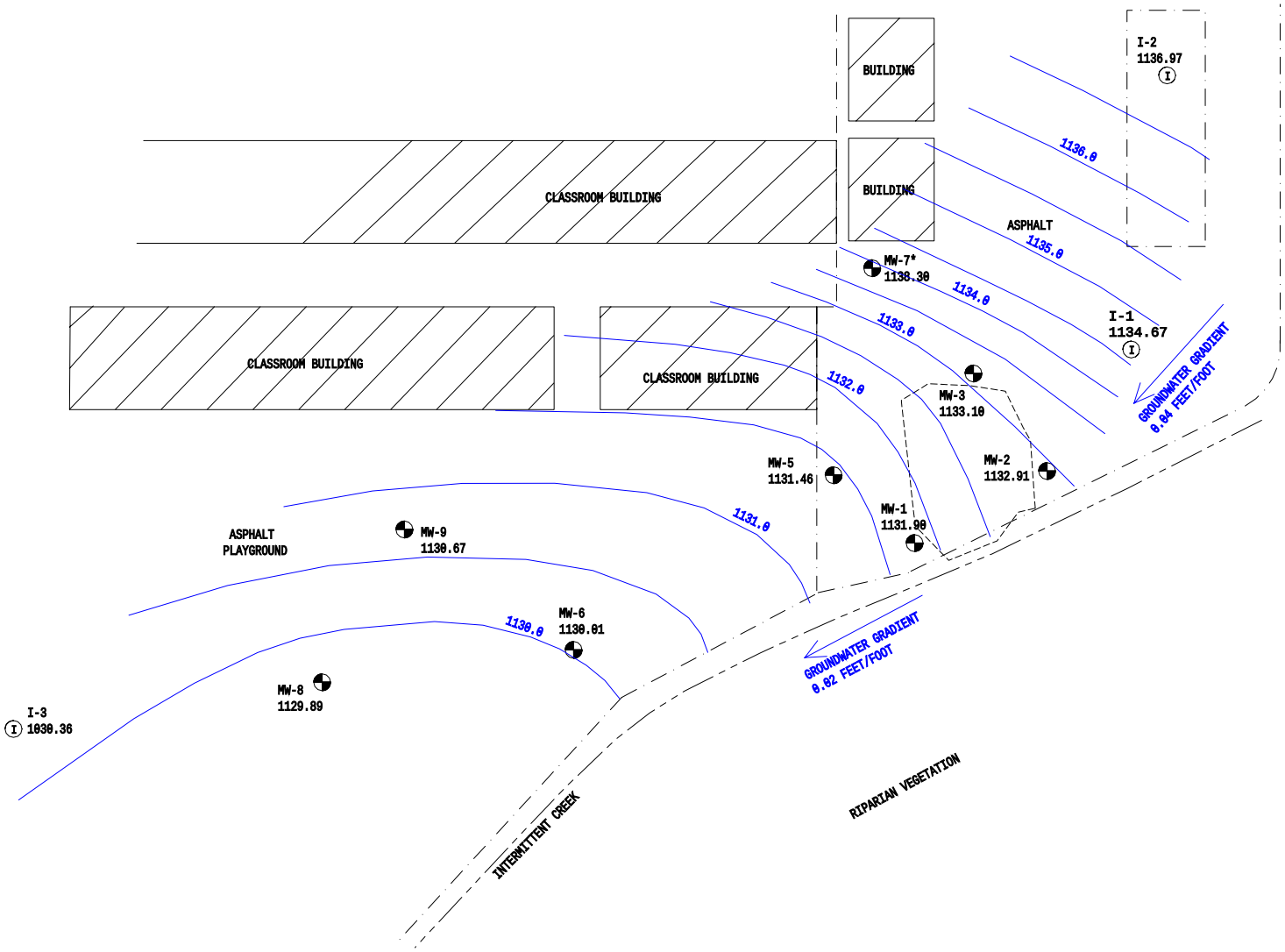
CHART X

MW-8 GROUNDWATER TRENDS





JAMUL-DULZURA SCHOOL DISTRICT



LEGEND

MW-8 1129.89	MONITORING WELL WITH GROUNDWATER ELEVATION (FT ABOVE MEAN SEA LEVEL), MEASURED 6/27/05
I-2 1136.97	IRRIGATION WELL WITH GROUNDWATER ELEVATION (FT ABOVE MEAN SEA LEVEL), MEASURED 6/27/05
*	WELL NOT USED TO CALCULATE GRADIENT
----------	LIMITS OF SOIL EXCAVATION AUGUST 25 - SEPTEMBER 1, 2000
— · — · -	FENCE
	GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (INTERVAL 0.5 FEET)

N

SCALE 1" = 50'

0 25 50 75 100

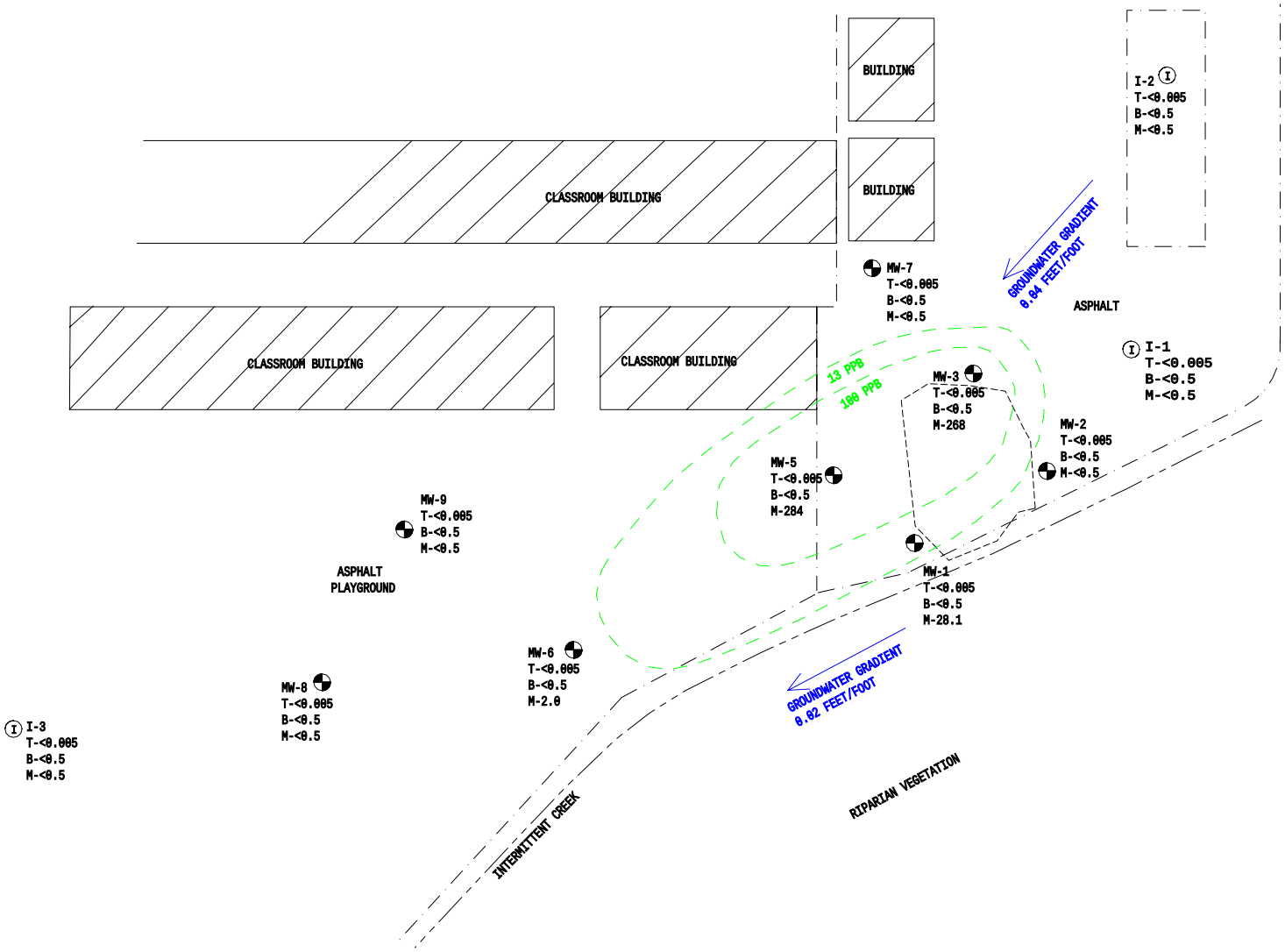
ALL DIMENSIONS AND LOCATIONS APPROXIMATE

JAMUL-DULZURA SCHOOL DISTRICT
14581 LYONS VALLEY ROAD
JAMUL, CALIFORNIA
PROJECT 267.1.19

FIGURE NO. 2: SITE PLAN WITH GROUNDWATER CONDITIONS

jamul-dulzura\drawings\267-1-18gw(2).skf

JAMUL-DULZURA SCHOOL DISTRICT



LEGEND

MW-3 T-<0.005 B-<0.5 M-268 — MONITORING WELL WITH T - TPH GASOLINE (PPM), B - BENZENE (PPB), M - MTBE (PPB), SAMPLED 6/27/05

I-2 T-<0.005 B <0.5 M <0.5 — IRRIGATION WELL WITH T - TPH GASOLINE (PPM), B - BENZENE (PPB), M - MTBE (PPB), SAMPLED 6/27/05

---------- LIMITS OF SOIL EXCAVATION AUGUST 25 - SEPTEMBER 1, 2000

— — · — FENCE

MTBE CONTOUR FROM 6/27/05 GROUNDWATER SAMPLING EVENT

ALL DIMENSIONS AND LOCATIONS APPROXIMATE

1

N

SCALE 1" = 50'

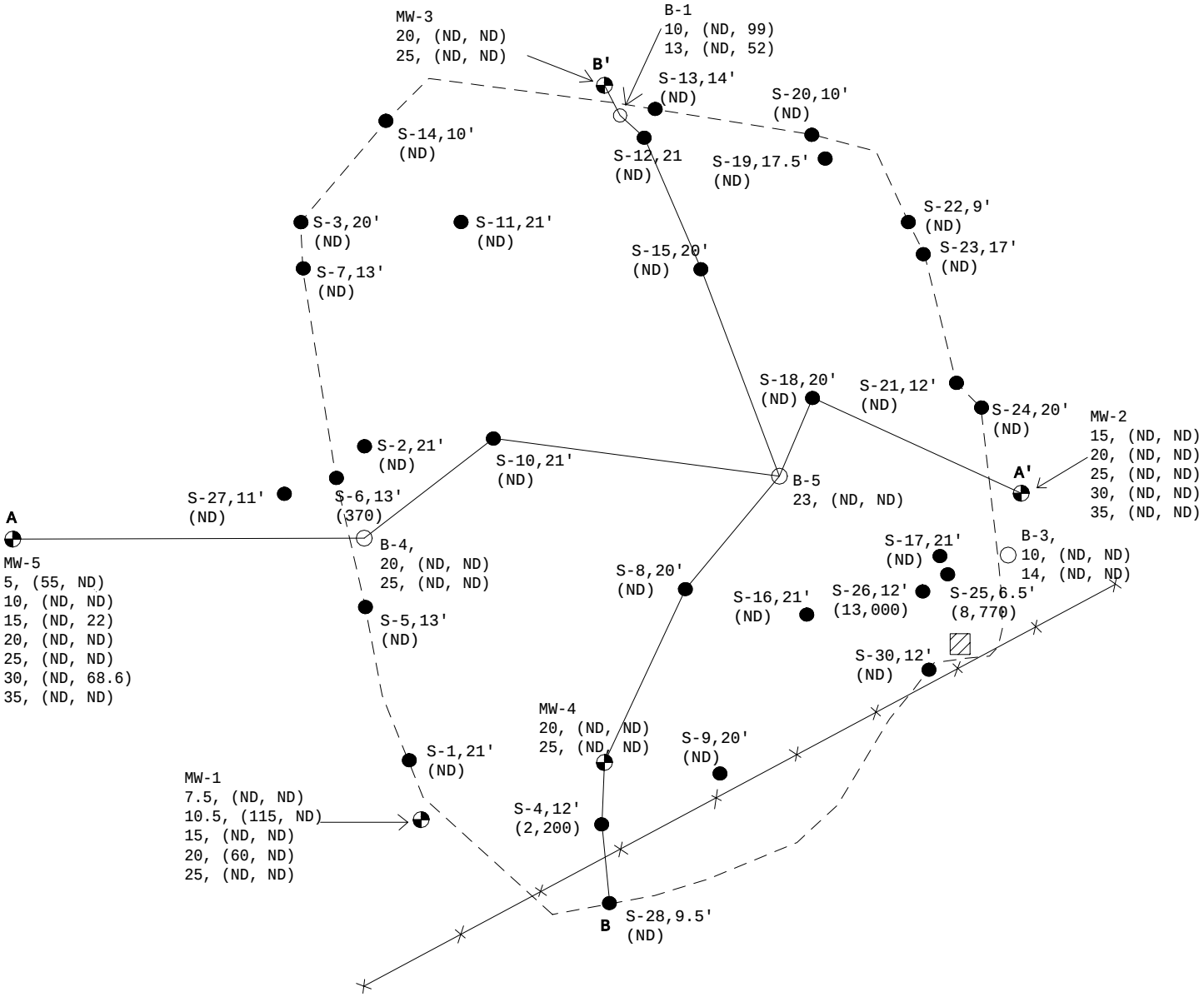
0 25 50 75 100

JAMUL-DULZURA SCHOOL DISTRICT
14581 LYONS VALLEY ROAD
JAMUL, CALIFORNIA
PROJECT 267.1.19

FIGURE NO. 3: SITE PLAN WITH MTBE CONTOURS

jamul-dulzura\drawings\267-1-18mtbe(2).skf

JAMUL DULZURA SCHOOL DISTRICT



LEGEND

- S-1 — LOCATION OF EXCAVATION SOIL SAMPLES WITH TPH CONCENTRATION (ppm)
- MW-1 — LOCATION OF MONITORING WELLS WITH SOIL SAMPLE DEPTH (ft), TOTAL TPH (ppm), AND MTBE (ppb)
- B-4 — LOCATION OF BORING WITH SOIL SAMPLE DEPTH (ft), TOTAL TPH(ppm), AND MTBE (ppb)
- FENCE
- LOCATION OF FORMER DISPENSER
- LIMITS OF EXCAVATION

N

SCALE: 1" = 10'

0 5 10 15

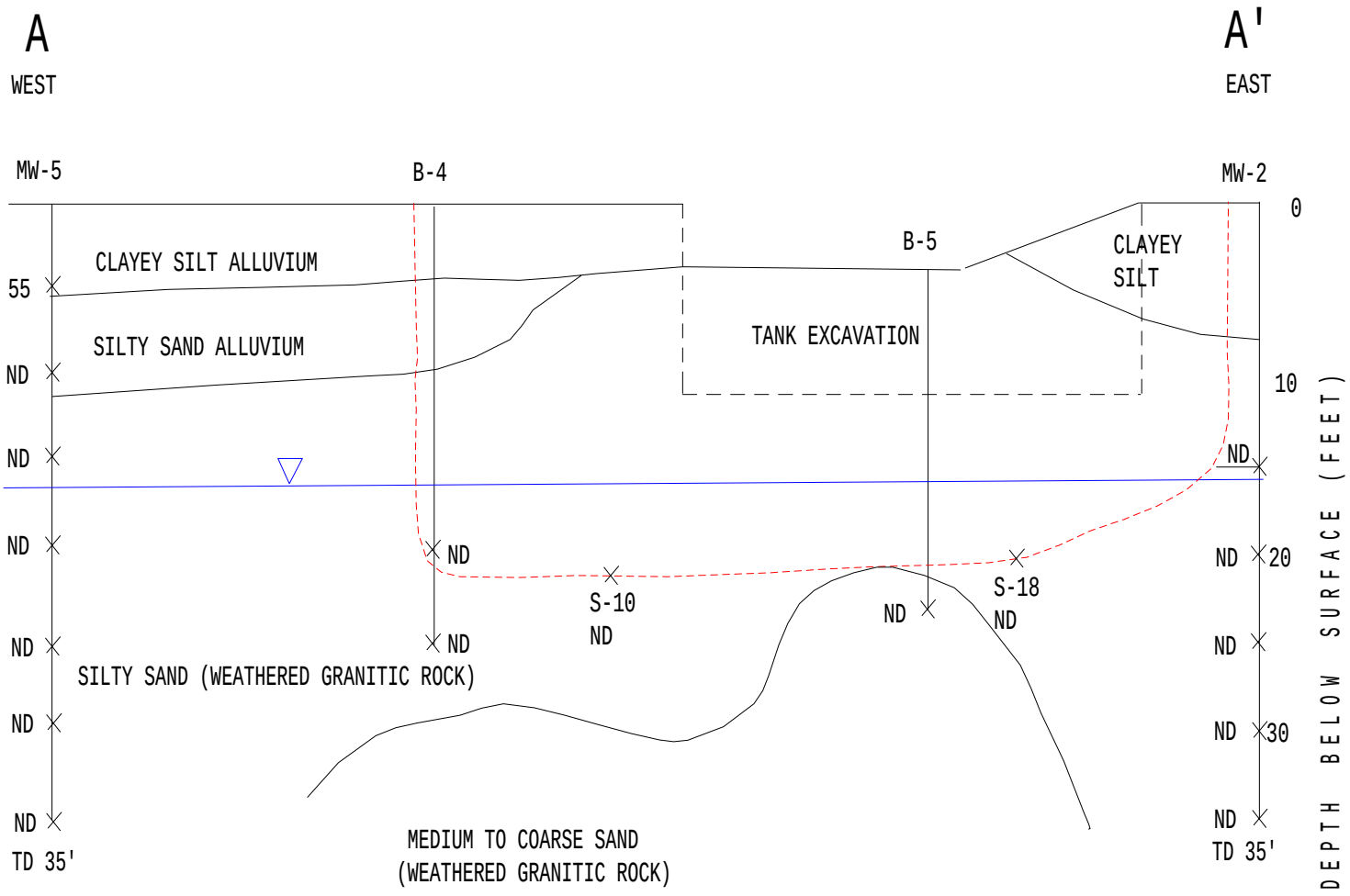
ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE

JAMUL-DULZURA SCHOOL DISTRICT
14581 LYONS VALLEY ROAD
JAMUL, CALIFORNIA
PROJECT NO. 267.1.18

FIGURE NO. 4: EXCAVATION AREA

jamul\drawings\1-8ust.skd

JAMUL-DULZURA SCHOOL DISTRICT



LEGEND

ND — SOIL SAMPLE WITH TPH CONCENTRATION (PPM)

GROUNDWATER LEVEL MEASURED 6/27/05

LIMIT OF SOIL EXCAVATION

GEOLOGIC CONTACT

ALL DIMENSIONS AND LOCATIONS APPROXIMATE

N

SCALE 1"=10'
VERTICAL = HORIZONTAL

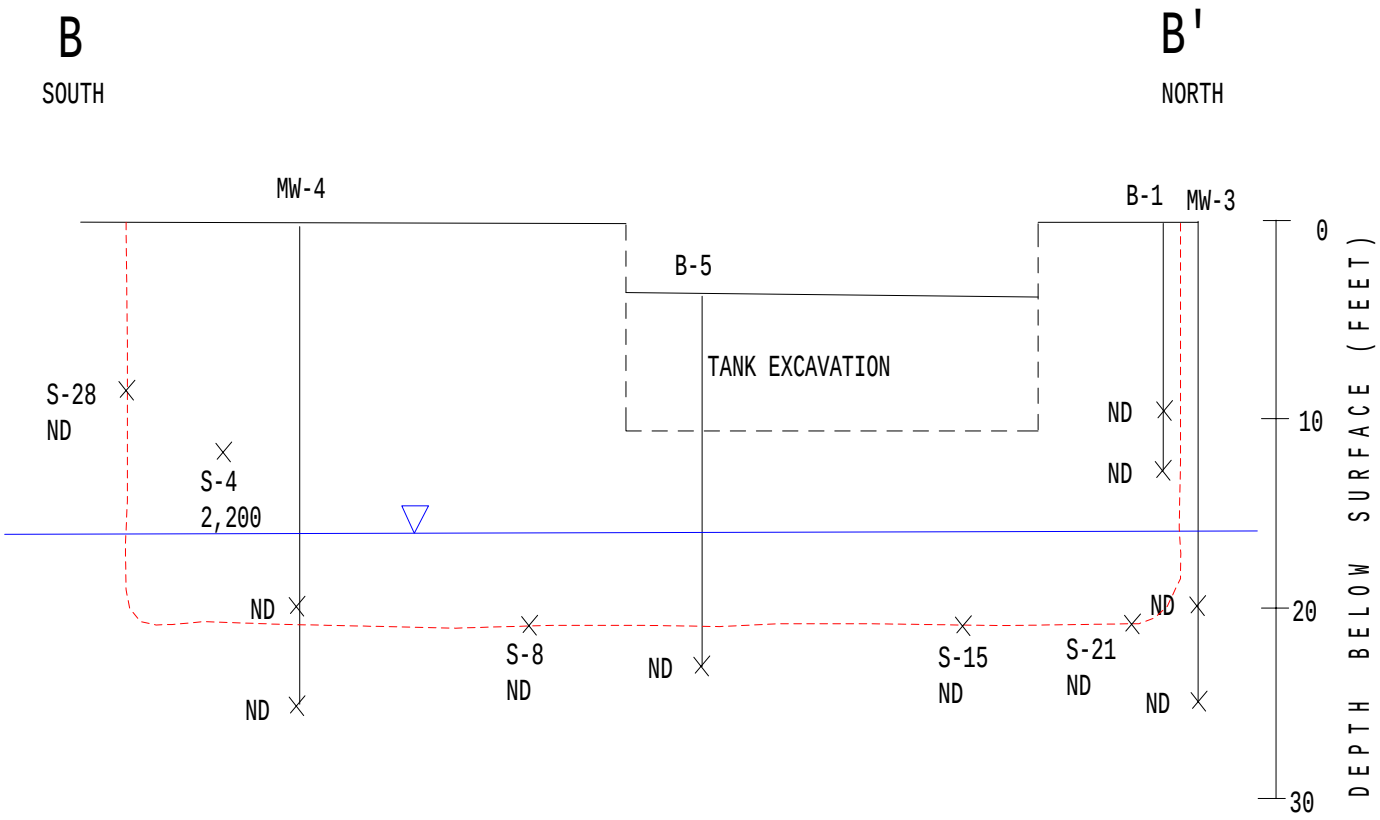
0 5 10 15

JAMUL-DULZURA SCHOOL DISTRICT
14581 LYONS VALLEY ROAD
JAMUL, CALIFORNIA
PROJECT NO. 267.1.18

FIGURE NO. 5: CROSS SECTION A-A'

jamul-dulzura\drawings\UST-Xs-a.skf

JAMUL-DULZURA SCHOOL DISTRICT



LEGEND

ND — SOIL SAMPLE WITH TPH CONCENTRATION (PPM)

GROUNDWATER LEVEL MEASURED 6/27/05

LIMIT OF SOIL EXCAVATION

GEOLOGIC CONTACT

ALL DIMENSIONS AND LOCATIONS APPROXIMATE

N

SCALE 1"=10'
VERTICAL = HORIZONTAL

0 5 10 15

JAMUL-DULZURA SCHOOL DISTRICT
14581 LYONS VALLEY ROAD
JAMUL, CALIFORNIA
PROJECT NO. 267.1.18

FIGURE NO. 6: CROSS SECTION B-B'

jamul-dulzura\drawings\UST-Xs-b.skf

APPENDIX A

VAPOR RISK CALCULATIONS

Case Name:
Jamul Dulzurra School District Transportation Yard (Child Scenario)

CHEMICAL OF CONCERN:

Enter Chemical Name = MTBE

C11 benzene
C12 benzo(a)pyrene
C13 carbon tetrachloride
C14 chlorobenzene
C15 chloroethane (ethyl chloride)
C16 chloromethane (methyl chloride)
C17 1,2-dichlorobenzene
C18 1,3-dichlorobenzene
C19 1,4-dichlorobenzene
C20 1,1-dichloroethene (1,1-DCE)
C21 trans-1,2-dichloroethene
C22 1,1-dichloroethane (1,1-DCA)
C23 1,2-dichloroethane (1,2-DCA)

E11 dichloromethane (methylene chloride)
E12 ethylbenzene
E13 naphthalene
E14 methyl tertiary butyl ether (MTBE)
E15 tetrachloroethene (PCE)
E16 toluene
E17 1,1,1-trichloroethane
E18 1,1,2-trichloroethane
E19 trichloroethene (TCE)
E20 trichloromethane (chloroform)
E21 vinyl chloride
E22 xylene

Chemical Mixture (if app.) =

C27 Gasoline
C28 Kerosene
C29 Diesel

E27 Fuel Oil
E28 Waste Oil

If compound is not listed then data must be entered into the site-specific field.

SITE SPECIFIC INFORMATION			Site-Specific	Value Used
Mole fraction	dimensionless	MF		0.0000
Temperature	K	T		293
Water concentration (chemical)	ug/l	C_w	284	284
Soil concentration (chemical)	mg/kg	C_t		0
Soil concentration (TPH/TRPH)	mg/kg	C_t		0
Soil gas concentration (measured)	mg/m3 (ug/l)	C_{sg}(m)		0
Depth of contamination or Soil Gas	m	X	4.85	4.85

CHEMICAL PROPERTIES			Site Specific	Value Used
Henry's Law Constant	dimensionless	H	2.40E-02	0.024
Vapor pressure	atm	VP	3.20E-01	0.32
Molecular weight (chemical)	mg/mole	MW	88150	88,150
Molecular weight (mixture)	mg/mole	MW(m)		#N/A
Universal gas constant	atm-m3/mole-K	R	XXXXXXXXXX	8.20E-05
Diffusion coefficient in air	cm2/sec	D_a	8.00E-02	0.08
Organic carbon partitioning coef.	cm3/gm	K_{oc}	7.80E+02	780
SOIL PROPERTIES				
Total porosity	dimensionless	θ		0.3
Air-filled porosity	dimensionless	θ_a		0.2
Water-filled porosity	dimensionless	θ_w	XXXXXXXXXX	0.1
Bulk density (dry)	gm/cc	r_b		1.8
Weight fraction of organic carbon	dimensionless	foc		0.01
BUILDING SPECIFICATIONS				
Floor area of building	m2	A		1
% of floor area that flux occurs	dimensionless			100%
Interior Height of building	m	R_h		2.44
Exchange rate of air	exchanges/hr	E	0.5	0.5
Slab Attenuation factor	dimensionless	S_b		0.1
OUTDOOR AIR COMPONENT				
Downwind contamination length	m	L		0
Wind speed	m/hr	u		16000
Height of building openings	m	h		2
EXPOSURE SCENARIO Default values are for Industrial Uses				
Body weight	kg	BW	15	15
Inhalation rate	m3/day	IR	10	10
Exposure duration	yrs	ED	7	7
Hours per day	hr/day		12	12
Days per week	days/week		5	5
Weeks per year	weeks/yr		36	36
HEALTH RISK FACTORS				
Reference dose	mg/kg-day	RfD	8.60E-01	0.86
Slope factor (potency)	1/(mg/kg-day)	SF	1.80E-03	0.0018

Case Name: Jamul Dulzurra School District Transportation Yard (Child Scenario)

Chemical: MTBE

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	8.82E+04	mg/mole
Vapor pressure	VP	=	3.20E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.84E+02	ug/l
Henry's Law Constant	H	=	2.40E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**6.82E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	0.00E+00	mg/kg
Henry's Law Constant	H	=	2.40E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.80E+00	gm/cc
Air-filled porosity	θ_a	=	2.00E-01	dimensionless
Water-filled porosity	θ_w	=	1.00E-01	dimensionless
Soil/water distribution coef.	K_d	=	7.80E+00	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=	**0.00E+00**	**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 6.82E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	3.00E-01	dimensionless
Air-filled porosity	θ_a	=	2.00E-01	dimensionless
Diffusion coefficient in air	D_a	=	8.00E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**4.18E-03**	cm2/sec
Depth of contamination or Csg	X	=	4.85E+00	m
Calculated Flux	**F_x**	=	**2.12E-03**	**mg/m2-hour**

Case Name: **Jamul Dulzurra School District Transportation Yard (Child Scenario)**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	1.00E+00	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Slab Attenuation factor	S_b	=	1.00E-01	dimensionless
Flux area within building	Af	=	**1.00E-01**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.44E+00**	m3
Exchange rate of air	E	=	5.00E-01	exchanges/hr
Ventilation rate	Q	=	**1.22E+00**	m3/hr
Indoor air component	**C_i**	=	**1.73E-04**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=	0.00E+00	m
Wind speed	u	=	1.60E+04	m/hr
Height of building openings (or height of breathing zone)	h	=	2.00E+00	m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION

C_t = **1.73E-04** **mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	1.50E+01	kg
Inhalation rate	IR	=	1.00E+01	m3/day
Exposure duration	ED	=	7.00E+00	yrs
Hours per day	conversion		1.20E+01	hr/day
Exposure time	ET	=	**5.00E-01**	hr/24 hours
Days per week	conversion		5.00E+00	days/week
Weeks per year	conversion		3.60E+01	weeks/yr
Exposure frequency	EF	=	**1.80E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**2.56E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**2.85E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.85E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.85E-05	mg/kg-day
Reference dose	RfD	=	8.60E-01	mg/kg-day
Hazard Index	**HI**	=	**3.31E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.85E-06	mg/kg-day
Slope factor (potency)	SF	=	1.80E-03	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**5.13E-09**	

Case Name:
Jamul Dulzurra School District Transportation Yard (Adult Scenario)

CHEMICAL OF CONCERN:

Enter Chemical Name = MTBE

C11 benzene
C12 benzo(a)pyrene
C13 carbon tetrachloride
C14 chlorobenzene
C15 chloroethane (ethyl chloride)
C16 chloromethane (methyl chloride)
C17 1,2-dichlorobenzene
C18 1,3-dichlorobenzene
C19 1,4-dichlorobenzene
C20 1,1-dichloroethene (1,1-DCE)
C21 trans-1,2-dichloroethene
C22 1,1-dichloroethane (1,1-DCA)
C23 1,2-dichloroethane (1,2-DCA)

E11 dichloromethane (methylene chloride)
E12 ethylbenzene
E13 naphthalene
E14 methyl tertiary butyl ether (MTBE)
E15 tetrachloroethene (PCE)
E16 toluene
E17 1,1,1-trichloroethane
E18 1,1,2-trichloroethane
E19 trichloroethene (TCE)
E20 trichloromethane (chloroform)
E21 vinyl chloride
E22 xylene

Chemical Mixture (if app.) =

C27 Gasoline
C28 Kerosene
C29 Diesel

E27 Fuel Oil
E28 Waste Oil

If compound is not listed then data must be entered into the site-specific field.

SITE SPECIFIC INFORMATION			Site-Specific	Value Used
Mole fraction	dimensionless	MF		0.0000
Temperature	K	T		293
Water concentration (chemical)	ug/l	C_w	284	284
Soil concentration (chemical)	mg/kg	C_t		0
Soil concentration (TPH/TRPH)	mg/kg	C_t		0
Soil gas concentration (measured)	mg/m3 (ug/l)	$C_{sg}(m)$		0
Depth of contamination or Soil Gas	m	X	4.85	4.85

CHEMICAL PROPERTIES			Site Specific	Value Used
Henry's Law Constant	dimensionless	H	2.40E-02	0.024
Vapor pressure	atm	VP	3.20E-01	0.32
Molecular weight (chemical)	mg/mole	MW	88150	88,150
Molecular weight (mixture)	mg/mole	MW(m)		#N/A
Universal gas constant	atm-m3/mole-K	R	XXXXXXXXXX	8.20E-05
Diffusion coefficient in air	cm2/sec	D_a	8.00E-02	0.08
Organic carbon partitioning coef.	cm3/gm	K_{oc}	7.80E+02	780
SOIL PROPERTIES				
Total porosity	dimensionless	θ		0.3
Air-filled porosity	dimensionless	θ_a		0.2
Water-filled porosity	dimensionless	θ_w	XXXXXXXXXX	0.1
Bulk density (dry)	gm/cc	r_b		1.8
Weight fraction of organic carbon	dimensionless	foc		0.01
BUILDING SPECIFICATIONS				
Floor area of building	m2	A		1
% of floor area that flux occurs	dimensionless			100%
Interior Height of building	m	R_h		2.44
Exchange rate of air	exchanges/hr	E	0.5	0.5
Slab Attenuation factor	dimensionless	S_b		0.1
OUTDOOR AIR COMPONENT				
Downwind contamination length	m	L		0
Wind speed	m/hr	u		16000
Height of building openings	m	h		2
EXPOSURE SCENARIO Default values are for Industrial Uses				
Body weight	kg	BW	70	70
Inhalation rate	m3/day	IR	20	20
Exposure duration	yrs	ED	25	25
Hours per day	hr/day		12	12
Days per week	days/week		5	5
Weeks per year	weeks/yr		36	36
HEALTH RISK FACTORS				
Reference dose	mg/kg-day	RfD	8.60E-01	0.86
Slope factor (potency)	1/(mg/kg-day)	SF	1.80E-03	0.0018

Case Name: Jamul Dulzurra School District Transportation Yard (Adult Scenario)

Chemical: MTBE

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	8.82E+04	mg/mole
Vapor pressure	VP	=	3.20E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.84E+02	ug/l
Henry's Law Constant	H	=	2.40E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**6.82E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	0.00E+00	mg/kg
Henry's Law Constant	H	=	2.40E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.80E+00	gm/cc
Air-filled porosity	θ_a	=	2.00E-01	dimensionless
Water-filled porosity	θ_w	=	1.00E-01	dimensionless
Soil/water distribution coef.	K_d	=	7.80E+00	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=	**0.00E+00**	**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 6.82E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	3.00E-01	dimensionless
Air-filled porosity	θ_a	=	2.00E-01	dimensionless
Diffusion coefficient in air	D_a	=	8.00E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**4.18E-03**	cm2/sec
Depth of contamination or Csg	X	=	4.85E+00	m
Calculated Flux	**F_x**	=	**2.12E-03**	**mg/m2-hour**

Case Name: **Jamul Dulzurra School District Transportation Yard (Adult Scenario)**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	1.00E+00	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Slab Attenuation factor	S_b	=	1.00E-01	dimensionless
Flux area within building	Af	=	**1.00E-01**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.44E+00**	m3
Exchange rate of air	E	=	5.00E-01	exchanges/hr
Ventilation rate	Q	=	**1.22E+00**	m3/hr
Indoor air component	**C_i**	=	**1.73E-04**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=	0.00E+00	m
Wind speed	u	=	1.60E+04	m/hr
Height of building openings (or height of breathing zone)	h	=	2.00E+00	m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION

C_t = **1.73E-04** **mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		1.20E+01	hr/day
Exposure time	ET	=	**5.00E-01**	hr/24 hours
Days per week	conversion		5.00E+00	days/week
Weeks per year	conversion		3.60E+01	weeks/yr
Exposure frequency	EF	=	**1.80E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**4.36E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**1.22E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	1.22E-05	mg/kg-day
Reference dose	RfD	=	8.60E-01	mg/kg-day
Hazard Index	**HI**	=	**1.42E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	4.36E-06	mg/kg-day
Slope factor (potency)	SF	=	1.80E-03	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**7.85E-09**	